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## **Sandia National Laboratories/California Pollution Prevention Opportunity Assessment**

### **Initial Data Gathering and Opportunity Identification (Tasks 1 and 2)**

Laurie Farren, Kristin Klossner, Jack Mizner, Anastasia Richardson

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### **Abstract**

This report describes the methodology, analysis and conclusions of a preliminary site assessment at Sandia National Laboratories-California (SNL/CA). The goal of this assessment is to evaluate organizations and operations at SNL/CA to determine ways to reduce waste generation and resource use and increase the purchase of environmentally preferable products. The ultimate purpose of this assessment is to analyze and prioritize organizations at SNL/CA for more in-depth assessments.

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## **Executive Summary**

This report was developed and completed by the Sandia National Laboratories/New Mexico (SNL/NM) Pollution Prevention (P2) Program with assistance from the SNL/California (SNL/CA) P2 staff. SNL/NM's P2 Program, part of Solid and Hazardous Waste Management (Organization #3124) was tasked with assisting SNL organizations to reduce waste and improve overall efficiency of their operations. This study was undertaken in response to increased hazardous waste generation at the SNL/CA site. It was noted that SNL/CA is creating approximately 40% of SNL's total hazardous waste. The SNL/NM and SNL/CA Pollution Prevention (P2) staffs have been actively working with key individuals and organizations. However, with only one full time P2 professional, SNL/CA does not have the resources to conduct a comprehensive site evaluation to determine cost-effective options for waste reduction, energy and water efficiency, and green purchasing measures.

The study will be completed in three phases: 1) Data Gathering and Analysis; 2) Ranking and Prioritization; and 3) Individual Pollution Prevention Opportunity Assessments (PPOAs). The first two phases are the subject of this report and provide a profile of selected SNL/CA organizations and operations and recommendations for further analysis. The final phase will entail in-depth assessments of selected SNL/CA organizations.

Profiled organizations were chosen for further study, based on analysis of data including waste generation rates, quantities of environmentally preferable items purchased and energy use. Information from SNL/CA P2 staff was crucial in the development of the profiles. Three members of the NM P2 staff visited the SNL/CA site to conduct interviews with key personnel from the selected organizations. Facility tours were also conducted. During the interviews, participants were asked about their processes in the light of potential waste reduction opportunities.

Numerous opportunities for improvement were identified during the interviews. P2 staff analyzed these opportunities, focusing on potentials for waste reduction, cost savings and ease of implementation. Four organizations were identified for individual PPOAs. The PPOAs will follow a standard format developed by the Department of Energy and the Environmental Protection Agency and utilize a team approach to developing alternatives to reduce waste and improve efficiency.

This report is a resource for all future efforts in waste reduction at SNL/CA site and can serve as a template for assessing sites with numerous and/or complex processes.

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## **1.0 Overview**

SNL is committed to reducing waste, and conserving energy and water in accordance with the DOE Energy Efficiency/Pollution Prevention (E2/P2) goals required by Executive Order 13148. These goals have been translated into performance metrics for waste reduction, recycling and purchase of environmentally preferable materials. The performance metrics are tracked and evaluated quarterly. Three of these performance metrics, reduction of hazardous waste (HW), purchase of environmentally preferable products, and diversion of waste through recycling, will be difficult to achieve with the current operating conditions. The SNL/NM and SNL/CA Pollution Prevention (P2) staffs have been actively pursuing these goals by working with key individuals and organizations. However, with only one full time P2 professional, SNL/CA does not have the resources to conduct a comprehensive site evaluation to determine cost-effective options for meeting all of the performance metrics.

### **1.1 Analysis Approach**

To reduce the financial and environmental impact of SNL/CA operations the SNL/NM and SNL/CA P2 staff has been funded to jointly analyze SNL/CA operations. The analysis will include a comprehensive evaluation of waste generating activities, purchasing procedures and energy and water use at SNL/CA. The goal of this analysis is to identify, prioritize and evaluate alternatives to current operating practices to improve efficiency, reduce waste, increase recycling and increase the purchase of environmentally preferable products. The analysis will consist of three specific tasks, conducted during FY02 and FY03. Tasks 1 and 2 are the subject of this report. All tasks are identified below:

**Task 1 Data Gathering and Analysis.** This task consists of quantifying the types and amounts of waste generated; purchasing procedures and products, and energy and water consumption at SNL/CA. Information from the SNL/CA Waste Management Database was also evaluated. This evaluation was limited to the last five years. Waste generation was tracked to each organization and if possible to the specific generating process. Contracts and purchasing records were reviewed and tracked to organizations. The Energy Management program was also evaluated. This analysis formed the basis for subsequent tasks.

**Task 2 Ranking and Prioritization.** Processes and organizations identified in Task 1 were evaluated to determine the potential for improvements in operating practices. Similar processes were grouped and evaluated together. The purpose of this task was to identify the order in

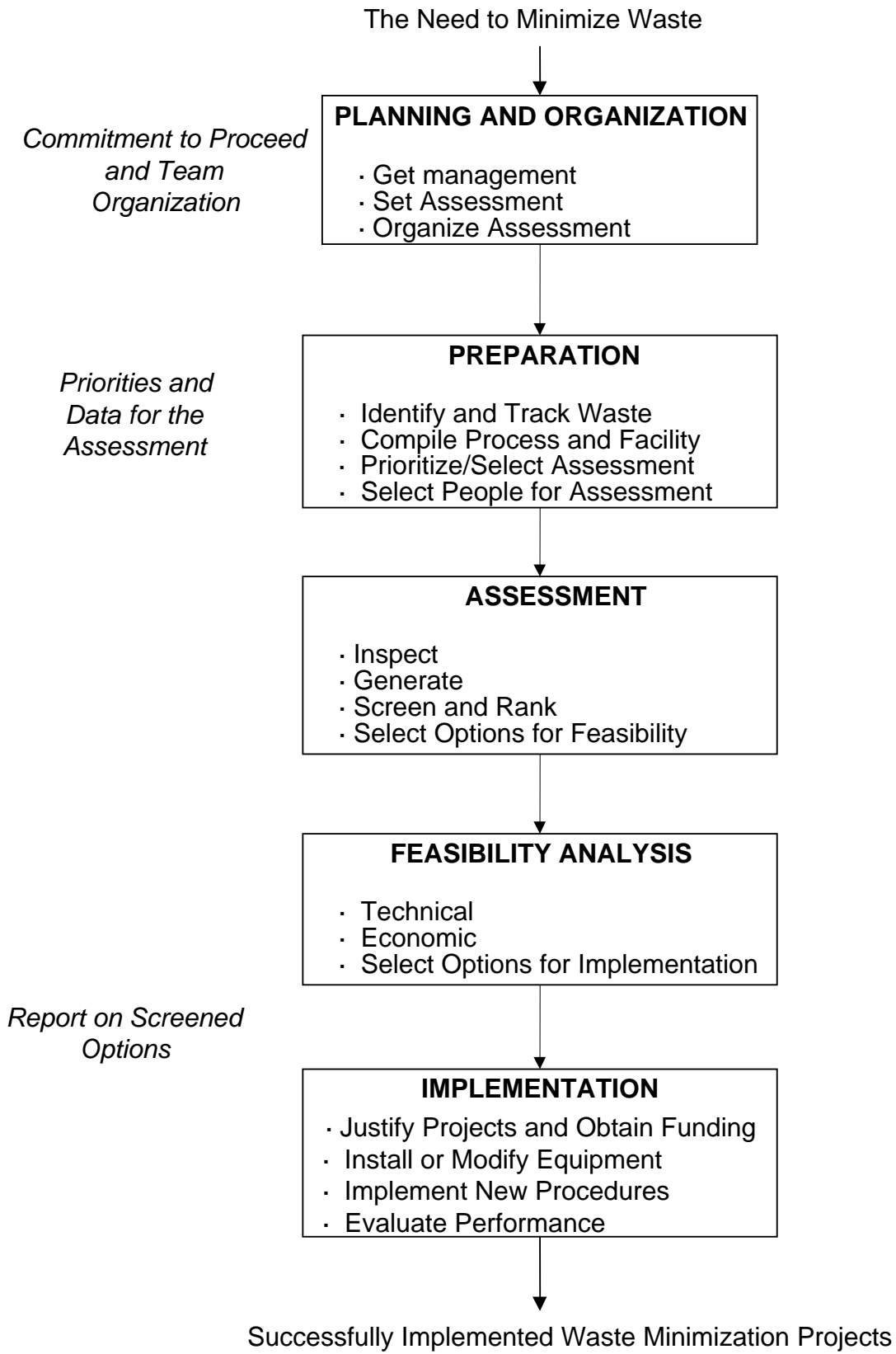
which subsequent Pollution Prevention Opportunity Assessments (PPOAs) as defined in Task 3 will be conducted, and to develop a schedule for conducting them. The following criteria were used to evaluate activities:

- Waste generation rates
- Compliance with E.O. 13101 purchasing requirements
- Potential for improvements in process
- Potential for water and energy conservation

**Task 3 Conduct individual Pollution Prevention Opportunity Assessments (PPOAs) (FY02 and 03).** The PPOA methodology, developed by the Department of Energy (DOE) and the Environmental Protection Agency (EPA), uses a systematic, team approach to identify and quantify opportunities for waste, energy and water use reduction, and the purchase of environmentally preferable products. The purpose of the PPOA is two part: 1) to evaluate the sources of waste, use of resources, and the availability of environmentally preferable products and contracting mechanisms and 2) to conduct technical and cost-benefit analyses to determine alternatives to the current operating practices. The completed PPOA then is presented to the line organization for implementation. The goal of a PPOA is to:

- Reduce waste volumes and toxicity
- Improve the system for tracking and reporting environmental improvements
- Reduce the line organization's operational costs

Figure 1 is a flow diagram that outlines in steps the PPOA process. This process will be applied to each of the individual assessments. Implementation for each individual assessment is dependent on available budget and resources and will be determined by SNL Management.



**Figure 1. PPOA Process**

PPOAs will be conducted in FY02 and 03, based on the ranking and prioritization developed in Task 2. The individual PPOAs will focus on specific activities. A multi-disciplinary team will be formed for each PPOA. This team will include SNL/CA personnel from the line organizations who are most familiar with the process and SNL/CA and SNL/NM P2 Staff. The purpose of the PPOAs is to identify feasible, economic and practical alternatives to current operating practices. The deliverable for each of the PPOAs will be a technical and cost-benefit analysis for each of the alternatives and recommendations and projected schedule for implementation.

Each of the completed tasks will be presented to SNL management for implementation. This report summarizes the activities completed for Tasks 1 and 2 and will be used to identify individual PPOAs.

P2 personnel from SNL/CA and SNL/NM will work together to share information and expertise. The PPOA process depends heavily on involvement of Line personnel. Mini-teams are created made up of selected members of the organization(s) involved in the assessment. Generally, team members include management, operations, and support staff. P2 Staff organize and facilitate team interactions. Working sessions are set up to encourage Line personnel to share both concerns and suggestions about their waste generating processes in an open way. Numerous tools are used to encourage this form of interaction including brainstorming, and process diagrams.

Ideas and alternatives are compiled after the meeting(s) and ranked based on priorities determined by the Line staff. These priorities might include safety issues, disposal costs, volume of waste, ease of implementation, and return on investment. Often, during the idea-generating phase, simple waste reduction ideas involving little cost or effort are identified. These can usually be implemented immediately.

Based on the ranking, one or several options are identified for further analysis. These options then undergo a technical and economic analysis by P2 staff based on Line input. Upon completion of the analysis, monetary considerations are evaluated. P2 Staff will assist the Line in locating funding for projects by writing funding proposals. P2 will also follow up with the Line to insure smooth implementation of new projects.

## **1.2 SNL/CA Site Information**

Sandia established its California site in 1956 to support weapons engineering with its across-the-street neighbor Lawrence Livermore National Laboratory. SNL/CA employs slightly more than 1000 persons, who are housed in about

60 buildings on 413 acres. The current fiscal year budget for SNL/CA is more than \$152 million.

SNL/CA research is focused on manufacturing-related research such as microelectronics, nano-technologies, combustion research, materials synthesis and processing, materials characterization, process simulation, engineering theory and design, prototype fabrication, and demonstration techniques. SNL/CA's mission is to be an agile manufacturing test bed for low-cost prototypes and development, as needed by US industries. Applications include welding technologies, semiconductor fabrication, sensors, high-performance metals, ultra hard ceramic coatings, and computational modeling and analysis.

The SNL/CA site has many small, diverse R&D operations that use resources and generate a significant proportion of SNL's waste. The impacts of SNL/CA operations include:

- Hazardous Waste: SNL/CA generates approximately 40% of the SNL's HW. In FY02 SNL/CA generated 17,590 kg of HW and spent approximately \$350,000 to dispose of it.
- Purchasing: Due to different contracts and procurement procedures, SNL/CA has been unable to fully implement the requirements of Executive Order 13101 and has only achieved a 50% compliance rate.
- Solid Waste Recycling: Because of the site infrastructure, a comprehensive recycling program has been difficult to implement.

## **2.0 Identification of Waste Generation and Resource Use**

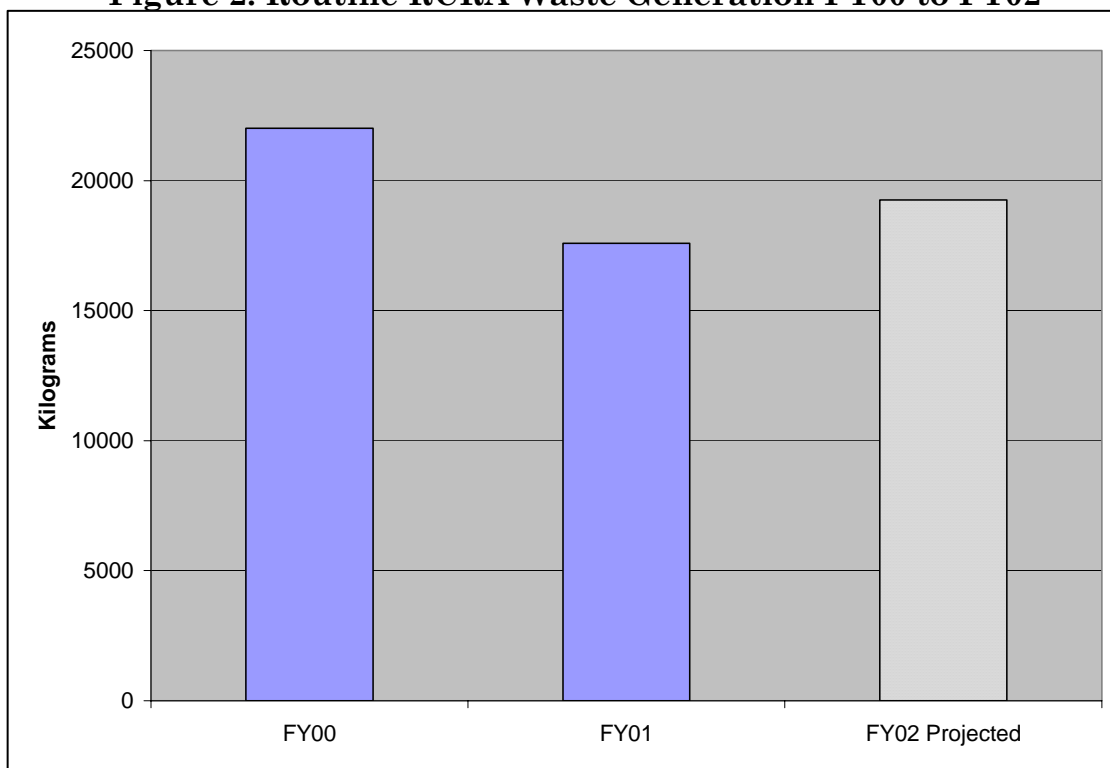
The first step of this study was conducted in late May and early June of 2002. Waste streams, purchasing information and energy use were evaluated by analyzing records from various sources including the Waste Information Management System (WIMS) data base, SNL/CA Container Log, DOE site specific Affirmative Procurement database and energy consumption information posted on SNL/California's energy web page. This analysis identified the largest waste generators in the categories of Resource Conservation and Recovery Act (RCRA) regulated hazardous waste, non-RCRA California regulated hazardous, low-level radioactive waste (LLW), mixed waste, solid waste, the greatest energy users, and the areas of non-compliance with SNL Contract Clause II Section I.117: *Acquisition and use of Environmentally Preferable Products and Services*. The results for each of these categories are presented below.

All wastes described in this report are considered “routine” wastes. Routine wastes are from ongoing processes that are a regular part of Laboratory operations. “Non-routine” wastes are generated from one-time or unplanned activities such as decontamination and deconstruction (D&D), environmental remediation (ER), and spills.

## 2.1 RCRA Waste Generation

RCRA regulated waste is defined as a waste that meets any of the following conditions: exhibits, on analysis, any of the characteristics of a hazardous waste as defined in 40 CFR 261 Subpart C; has been named as a hazardous waste and listed as such in 40 CFR 261 Subpart D; is a mixture containing a listed hazardous waste and a nonhazardous solid waste; is a waste derived from the treatment, storage, or disposal of a listed hazardous waste; or is not excluded from regulation as a hazardous waste. Figure 2 shows SNL/CA's routine RCRA waste generated between FY00 and FY02. Table 1 contains the largest RCRA waste streams by quantity and fiscal year. Wastestreams in Table 1 are not source specific, but are grouped based on the waste characteristics. Figure 3 is SNL/CA's largest waste generators by fiscal year and organization.

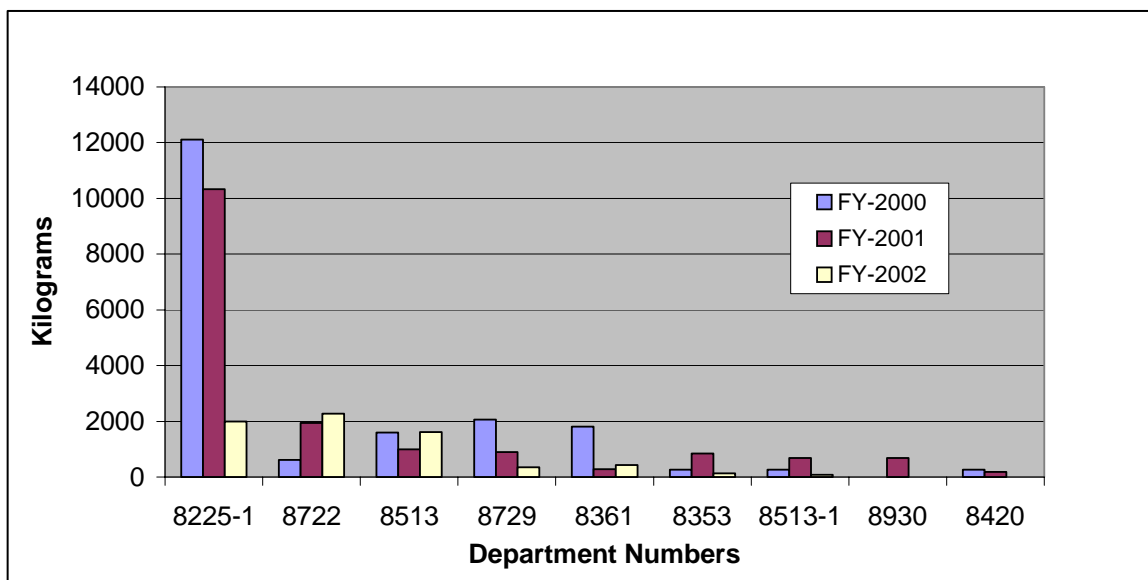
**Figure 2. Routine RCRA Waste Generation FY00 to FY02**





**Table 1. Largest Routine RCRA Waste Streams**

WASTE STREAMS	FY-2000	FY-2001	FY-2002
ELECTROLESS BATH	3685	2351	426
BATTERIES	1208	1598	1748
SODIUM HYDROXIDE WASTES	327	1549	1033
ETCH BATHS	1115	1142	228
DEVELOPER SOLUTIONS	958	1183.08	318
COAL	1439		379
HYDROCHLORIC ACID SOLUTIONS	419	1321	5
NICKEL WASTES	1331	71	95
FIXER SOLUTIONS	661	780	40
CATION ION EXCHANGE RESIN	1390		

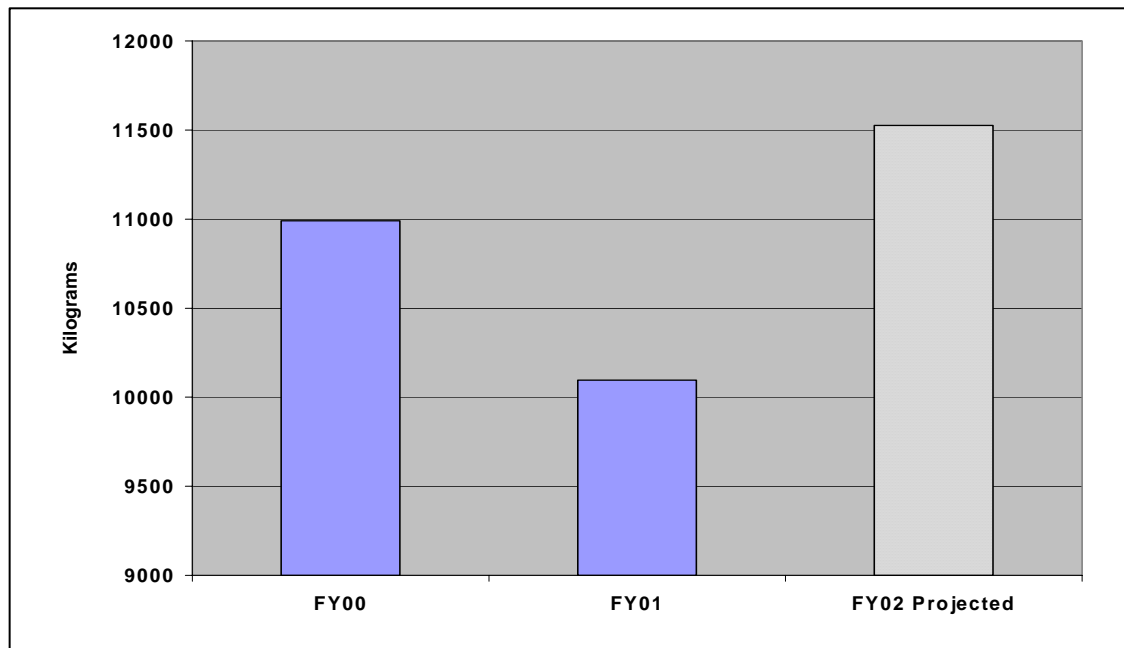


**Figure 3: Largest Routine RCRA Waste Generators FY00 to FY02**

## 2.2 California Regulated Waste

California state regulated wastes are any other waste not specifically regulated under RCRA or Toxic Substance Control Act (TSCA), which may be regulated by the State of California, such as, used oil. Figure 4 shows SNL/CA's routine California regulated waste generated between FY00 and FY02. Table 2 contains the largest California regulated waste streams by quantity and fiscal year. Wastestreams in Table 2 are not source specific, but

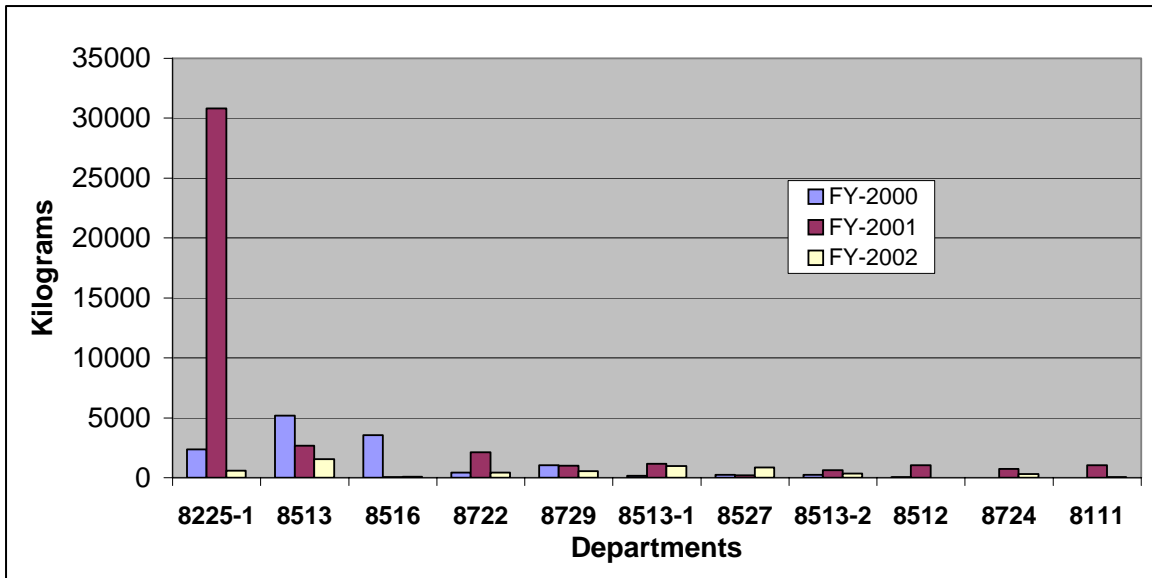
are grouped based on the waste characteristics. Figure 5 shows SNL/CA's largest California regulated waste generators by fiscal year and organization.



**Figure 4. Routine California Regulated Waste Generation FY00 to FY02**

**Table 2. Largest Routine California Regulated Waste Streams**

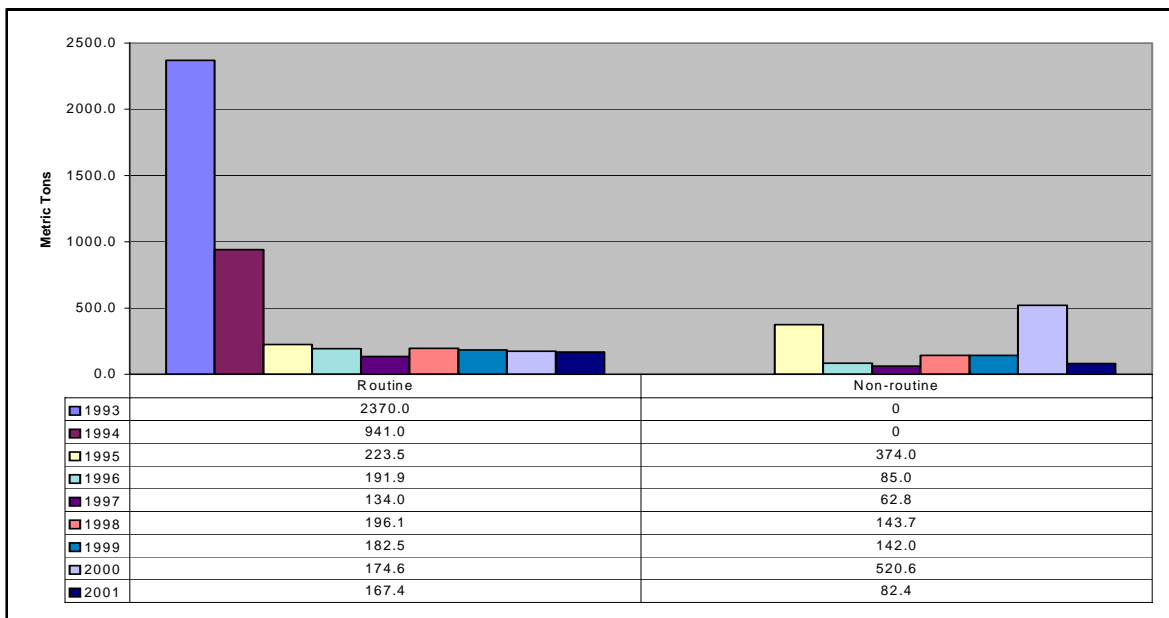
WASTE STREAM	FY 2000	FY 2001	FY 2002
CONTAMINATED WATER	3724.2	29063.25	656.05
OIL AND OIL CONTAMINATED DEBRIS	4772.75	5657.665	1320.33
COOLANT WASTE	1044	1971	32
CONTAMINATED EMPTY CONTAINERS	1180.1	1414.131	238.95
PCB WASTES	1307.5	506	537
RAGS AND WIPES CONTAMINATED	1045.6	888.113	256
ASBESTOS WASTES	30	1459.3	623
ACID AND BASE WASTES	182.4	900.076	258.25
LATEX WASTE	299.25	30	578
NICKEL CONTAINING WASTES	353	235.55	200



**Figure 5. Largest Routine California Regulated Waste Generators FY00 to FY02**

### 2.3 Sanitary Waste

Sanitary waste is waste such as garbage that is generated by normal housekeeping activities and is not RCRA, California state regulated or radioactive. Sanitary wastes are municipal in nature, such as non-hazardous industrial waste, food waste, sludge, construction and building demolition debris, concrete and asphalt. Figure 6 shows SNL/CA's routine and non-routine sanitary waste generated between FY93 and FY01.



**Figure 6. Sanitary Waste Generation from FY1993 to FY2001**

## 2.4 Low-level Radiological Waste

LLW is defined as waste that contains radioactivity and is not classified as high-level waste, transuranic waste, spent nuclear fuel, or 11e(2) by-product material as defined by DOE O 435.1. Figure 7 shows SNL/CA's Routine LLW generated between FY00 and FY02. Figure 8 shows SNL/CA's largest LLW generators by fiscal year, building, and organization.

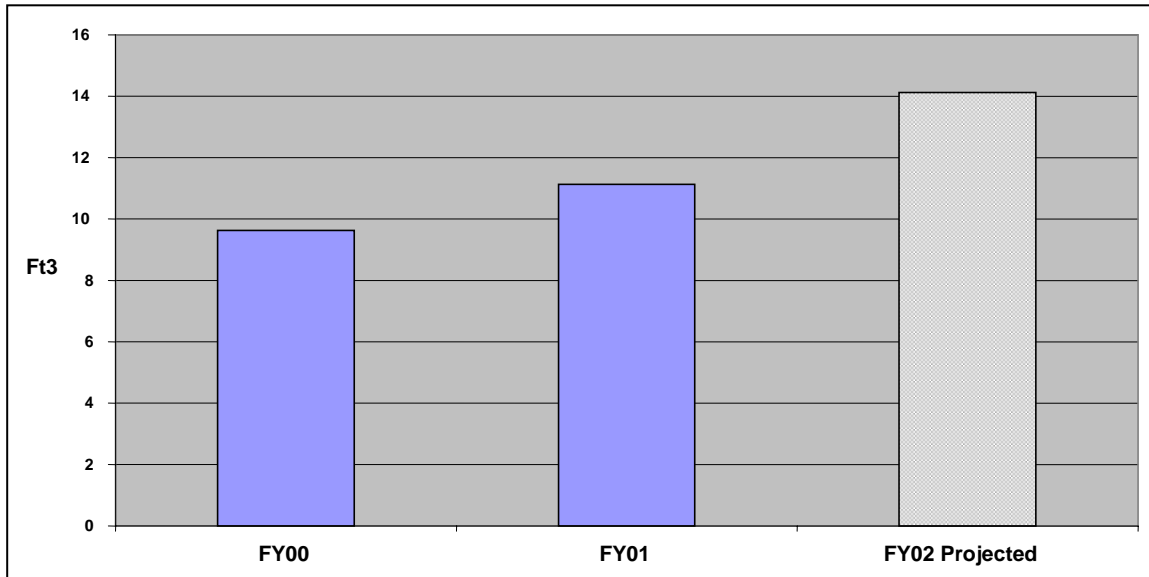


Figure 7. Total Routine LLW Disposed FY00 to FY02

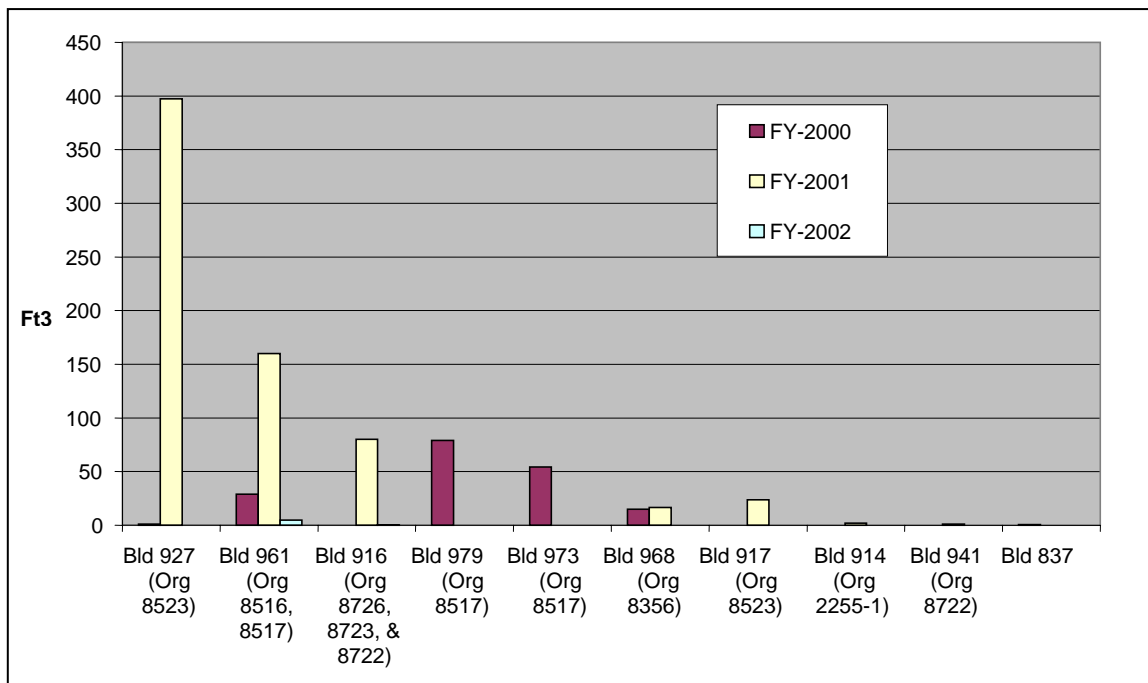
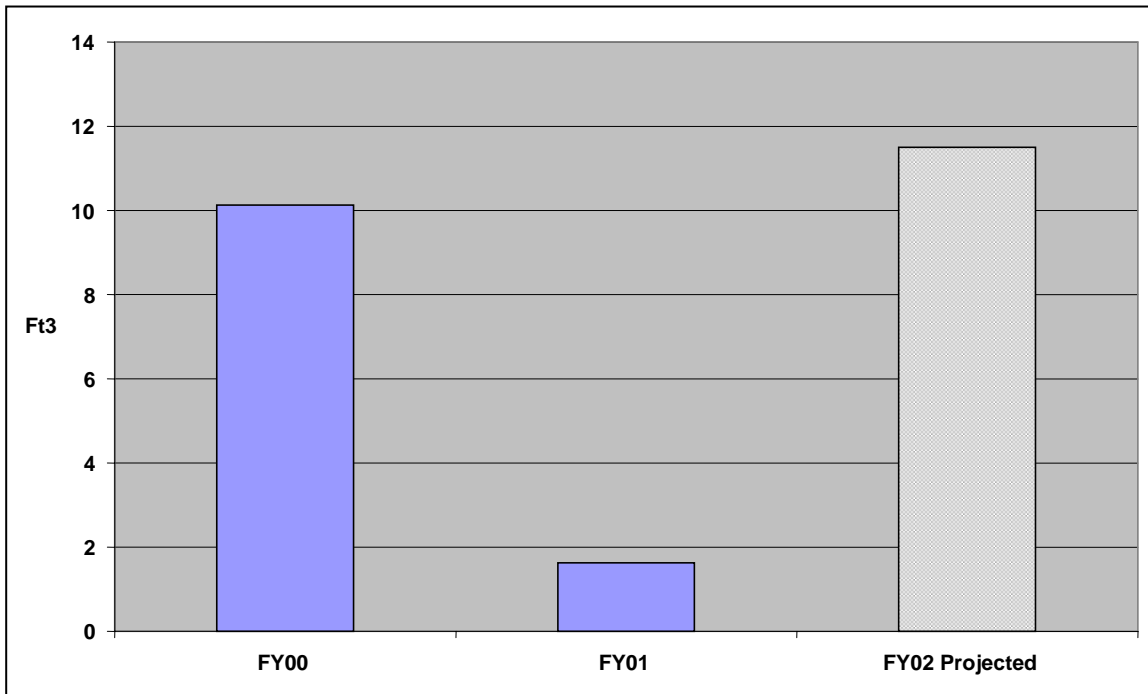


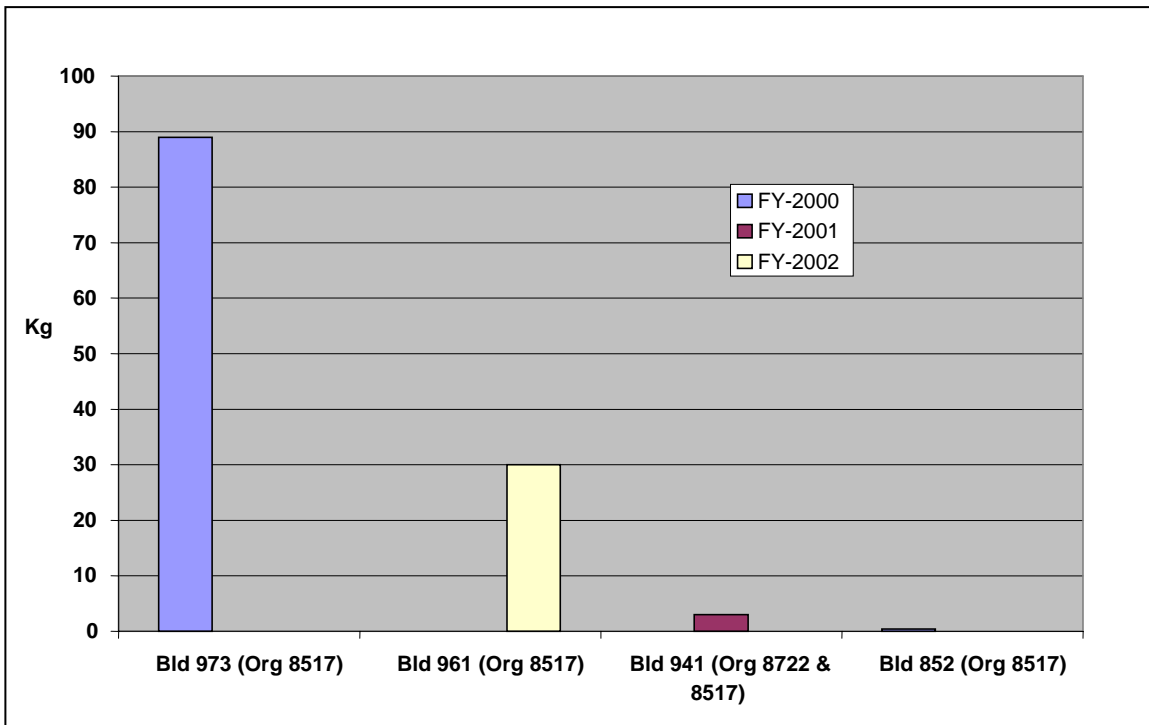
Figure 8. Routine LLW by Building and Organization FY00 to FY02

## 2.5 Mixed Low-Level Radiological Waste

A mixed waste is any waste that contains both a hazardous waste component, as defined in the Resource Conservation and Recovery Act (RCRA) and implementing regulations, and a radioactive waste component, as defined in DOE orders. (Effective July 9, 2001, transuranic waste is part of mixed waste.) A state may define additional waste as hazardous waste, thus causing other hazardous and radioactive waste mixtures to be regulated by the state as mixed waste. For waste management at Sandia National Laboratories, mixed waste includes low-level mixed waste, transuranic mixed waste, mixed waste that contains naturally occurring radioactive material (NORM), and mixed waste that contains radioactive commercial products that are not returned to the manufacturer. Figure 9 shows SNL/CA's routine mixed waste generated between FY00 and FY02. Figure 10 shows SNL/CA's largest routine mixed waste generators by fiscal year, building, and organization.



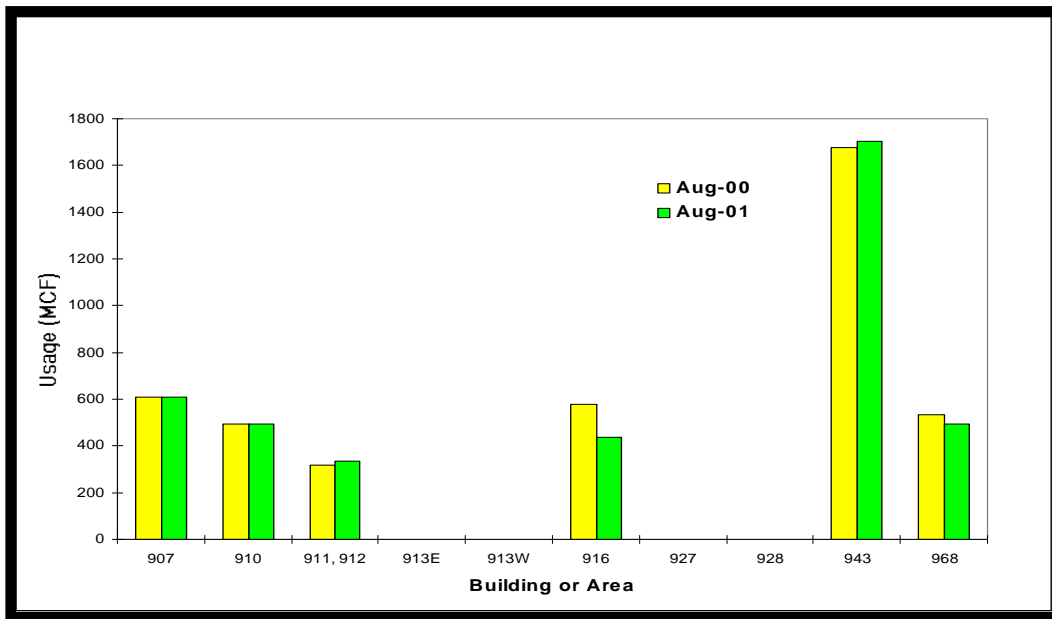
**Figure 9. Routine Mixed Waste Disposed FY00 to FY02**



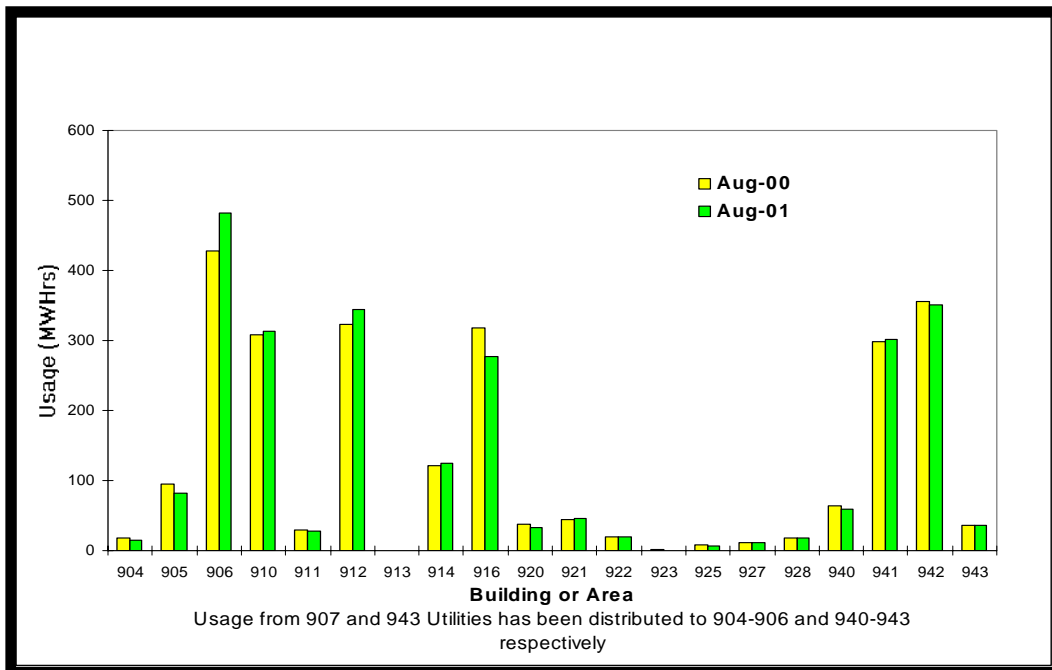
**Figure 10. Largest Routine Mixed Waste Generators FY00 to FY02**

## 2.6 Energy Use

At SNL California, energy use and propane use are tracked by building but occupants are not charged. The cost of energy and propane is considered a general overhead charge and is not passed on to users. This creates two difficulties with obtaining results from energy-saving measures. First, cost to the user is traditionally a prime driver in encouraging energy reduction. Since costs are not passed on to the user, users will not be as likely to voluntarily reduce their energy use. Secondly, since several organizations may share space in a building, it is difficult to determine energy used by each organization. Therefore, subsequent PPOAs will recommend energy reduction techniques but a discrete PPOA will be conducted on overall energy management at SNL/CA. Figure 11 shows SNL/CA's natural gas use by building for the month of August FY00 and FY01. Figure 12 shows SNL/CA's electric use by building for the month of August FY00 and FY01.



**Figure 11. Building Natural Gas Usage August FY00 & FY01**

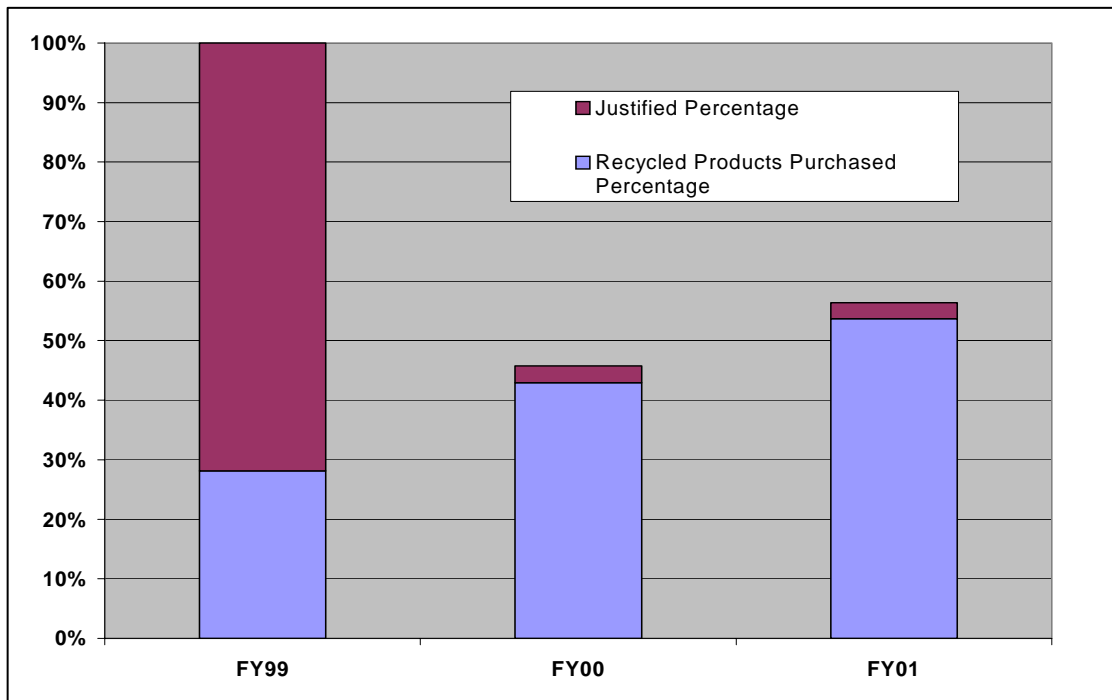


**Figure 12. Building or Area Electrical Usage August FY00 & FY01**

## 2.7 Green Purchasing

RCRA, Section 6002, requires federal agencies to purchase items designated by the Environmental Protection agency (EPA) as having recycled or recovered content. President Clinton's Executive Order 13101, *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*, requires all federal agencies to increase their effort in waste prevention, recycling and the purchase of environmentally preferable products. Environmentally Preferable Purchasing (EPP) or Green Purchasing is purchasing products, material and services that have a reduced effect on human health and the environment.

In May of 1996, the Secretary of Energy set a goal increasing the Department of Energy's procurement of EPA-designated items to 100% by December 31, 1999. The EPA allows Federal agencies to exclude from the total purchases those purchases where a product with recycled content was not available competitively, at a reasonable price, within a reasonable time frame, or did not meet performance standards. Figure 13 shows SNL/CA's current performance in meeting the 100% goal. In FY99 all products not purchased were justified, indicating 100% compliance. Beginning in FY00 more stringent justification standards were applied, reducing the reported compliance to 45 %. However, during that same time period the actual purchase of designated product continually increased.



**Figure 13. Percentage of EPA-Designated Products Purchased**



### **3.0 Organizational Summaries and Interviews**

Based on the initial evaluation of waste generation and resource use (Section 2), organizations that showed the greatest overall impact were identified. Key personnel from these organizations were interviewed. Summaries of these interviews follow. The transcripts of the interviews are found in Appendix A.

#### **3.1 *Environmental Operations, Organization 8516, Waste Management***

Environmental Operations employs approximately 20 persons, with 7 in Waste Management, and is responsible for compliance with waste regulations and physical management of hazardous and radioactive waste. Waste Management's main activities involve waste transport and repackaging. Waste generators call the waste pick up number when they have hazardous waste ready for pick-up. Waste Management personnel pick up the waste and transport it to the Hazardous Waste Storage Facility (Building 9622). There it is characterized, repackaged if necessary and shipped for recycling or final disposal. Environmental training is offered once a month and is required for every new hire. However, P2 methods and techniques are not currently addressed in this training. Environmental Operations occasionally generates LLW from support service. ER/D&D, spill cleanup, Liquid Effluent Control System (LECS) wastes are sometimes charged to Environmental Operations.

A significant issue regarding tracking of hazardous waste was identified. Upon pick-up, waste is logged into a database called the Container Log. These containers are brought to the Hazardous Waste Facility and repackaged into a drum for shipment and disposal. When a drum is filled, it is then entered into another database known as the Drum Log. Even though wastes in this drum often come from different generators, the contents of the entire drum are charged to the generator whose waste is placed in the drum first. This practice creates both an unfair charge for certain generators and skewed data on waste disposal costs. Since cost of waste disposal is the major impetus for waste reduction efforts, this also negatively affects the likelihood that generators will implement pollution prevention technologies. This issue is expected to be corrected by the end of next year. A project is underway to implement the WIMS tracking system used at SNL/NM at California. This system uses barcodes to track and charge waste to the actual generator.

Environmental Operations personnel had several ideas to reduce waste generation that could be implemented on a broad scale. These include:

- Take better advantage of the Satellite Accumulation Area (SAA) system by increasing waste accumulation up to 55 gallons and stop shipping small amounts.
- Add a significant P2 section to new employee orientation and generator training and update the training annually
- Evaluate purchase of non-refillable gas cylinders. These non-refillable containers cost approximately 100K per year to dispose.
- Reduce the number of waste containers through consolidation and improved planning and management.

### ***3.2 Environmental Operations, Organization 8516, Low Level Waste (LLW) Program***

The LLW Program coordinates efforts for characterization and certification of low-level and mixed waste and assists researchers in defining parameters and identifying waste types.

Waste forecasting is required on a yearly basis. These forecasts are generated by the Waste Program Engineers with assistance from Waste Generators. Hazardous waste is also forecasted in this manner.

Process Knowledge Evaluation (PKE) is used to characterize waste. The waste generator completes the PKE with assistance from the Waste Program Engineer, prior to the generation of waste. The PKE helps reduce the generation of low-level and mixed waste. It may be initiated during ES&H procedure reviews, by request, or through the Interdisciplinary Team (IDT). The IDT, which consists of members from each environmental discipline meets on a weekly basis with Line members. The team reviews new waste generating processes for all waste categories and identifies points for improvement. It also serves as a tool to identify National Environmental Policy Act (NEPA) concerns. Processes are also evaluated using the ISMS process and NEPA modules as required by the SNL ES&H Manual.

Occasionally, Line personnel seem to be unclear as to what issues are appropriate for the IDT discussion. Though the process is always initiated at the start of a process, sometimes process changes are not included. An Evaporator bought by the Machine Shop (Org. 8225) is an example of bypassing IDT being process. This purchase could have been avoided if an appropriate evaluation had been completed before purchase.

There are two profiled LLW streams: R&D and Support Services. These are expected to be consolidated into one this year. The waste streams consists of uranium parts, soil, concrete rubble, PPE, plastic lining, steel, and contaminated metal equipment. Routine (research-related waste) and Non-routine (Support Services-related waste are placed in the same container.

Research waste is considered routine. The main waste stream generated at the LLW facility is PPE.

The LLW Program has sources that are packaged and ready for disposal. Program employees expect to ship waste within a year.

SNL/CA does generate mixed waste, but in very small quantities. Most mixed waste was due to the deconstruction of Building 913. Mixed waste is generally contaminated lead, soil, piping and contaminated metal. Generators must get approval from the SNL/CA Vice President prior to the generation of mixed waste.

SNL/CA does not currently have a site treatment plan. Because of the existence of the SNL/NM treatment facility, DOE determined that SNL/CA does not need one. With that in mind, SNL/CA works under the constraints of their RCRA Part B Permit and ships waste off-site within one year.

The Metals Moratorium has not significantly affected the site. Building 913 would have been affected but it was determined that the site did meet the definition. SNL- CA recycles non-contaminated scrap metals through the Reapplication Department.

Several P2 ideas were generated in the interview. They include:

- Create purchase controls on sources and improve the use of source banks.
- Costs could be saved in revising the waste profiles since the Nevada Test Site, where the waste is disposed, has stringent requirements for source characterization.
- Screen sources prior to acceptance, for reuse at the source bank.
- Re-evaluate the potential of dedicating the compactor to LLW to reduce volume.
- Review uranium waste issues with the Central Scrap Management Bank at the Y12 Plant in Oakridge.
- Return uranium machining waste material to Lawrence Livermore National Laboratory (LLNL). This may reduce SNL/CA waste, but not for the DOE complex as a whole. This could create a negative impact on the Machine Shop since it might encourage the customer to send their work somewhere else.
- Enhance the IDT process to better identify P2 opportunities.
- Enhance waste generator training to include P2.

### **3.3 Environmental Operations, Organization 8516, Stormwater, Wastewater, and Groundwater Management**

The main function of this management program is to monitor and improve SNL/CA's compliance with various water regulations. The group's main focus is to maintain compliance with applicable regulations, including management of the six liquid effluent control systems (LECS) on the site. Non-radioactive wastewater from on-site labs is collected in these tanks prior to release to the City of Livermore's sewer system. Industrial water is tested prior to leaving site. Most LECS have at least two tanks: one is used while the other is sampled. If water discharged to the LECS meets the Wastewater Discharge Permit limits, it is discharged to sewer. If it's over the limit, it is pumped out and sent offsite to a treatment facility generating approximately 4000 gallons of hazardous waste per incident.

Permit violations occur 3 to 4 times per year mainly due to metal contamination (copper, lead, zinc and silver). The CRF (Building 906) and the Cooling Tower (Building 907) are often the cause of this permit non-compliance. Problems started with elevated levels of copper at the 906 LEC soon after new construction at these facilities. One theory is that metals are scavenged from the piping in the cooling tower system for Buildings 907, possibly through galvanic corrosion. It may also result from the concentration of chemicals through evaporation in the chilled water loop at the CRF. An ion exchange unit has been installed at the cooling tower to minimize sending water offsite. Investigations into the source of the copper and zinc are on going.

Other areas have occasional problems with different metals. Violations can occur on weekends/evenings due to maintenance off-hour activities. Stormwater personnel will conduct a site wide drain survey this year. Water effluent is considered and reviewed in the IDT process.

P2 opportunities identified during the course of the interview included:

- Evaluate biocide use in cooling towers to determine if its use caused metal scavenging
- Replace the ion exchange unit that was purchased several years ago and has never functioned properly.
- Consider the potential of reducing the number of drains entering the LECS. Some may be from sources that are not required to enter the LECS. This could reduce the volume of water entering the LECS
- The source of water is from the Hetch Hetchy reservoir. Evaluate this water source, is very soft and may scavenge metals from piping

### **3.4 Health and Safety Department, Organization 8517, Chemical Inventory/MSDS Management**

This organization is responsible for Chemical Inventory System (CIS) and Material Safety Data Sheet (MSDS) management at SNL/CA. Chemicals are purchased through a purchase-card. All chemicals enter the site at a centralized receiving facility where they are bar-coded. Data from the bar coded chemicals is entered in the chemical inventory system. A variety of chemicals are ordered from many vendors and usually arrive within 2 days. Meeting the needs of researchers with quick turnaround times was a priority in developing the chemical ordering system. There is no monitoring for quantities, meaning that a container is listed as either full (still in use) or empty (when disposed). The CIS is reconciled every summer.

### **3.5 Logistics and Procurement, Organization 8523**

SNL CA procurement is tasked with obtaining high-quality supplies and services, as specified by its customers, in a cost-effective, timely, and compliant manner. One of their main functions is to supply office products, for which there is a Just in Time (JIT) contracts in place. There is no requirement to use JIT so office supplies are often purchased via procurement card (p-card) from various companies. The JIT purchasing route is often avoided because of complaints about time to receive materials and quality of the products. Every group on site purchases materials on their own from who ever they want. There is no consistent purchasing mechanism in place.

The majority of office supplies are purchased through Staples on a p-card. Staples has an agreement with Lockheed-Martin to provide office supplies at a reduced price. Staples offers a limited selection of recycled products, which are seldom ordered due to perceived quality issues and price difference.

Upper management and procurement personnel reviewed the contractual language for Affirmative Procurement (AP) along with the Executive Order. They determined that the requirements were an option and are not currently adhered to.

P2 opportunities identified during the course of the interview included:

- Revisit the interpretation of the Executive Order and SNL contractual requirements.
- Purchase recycled toner cartridges.
- Include green purchasing information with p-card training.
- Investigate the possibility a Breadman contract. In this type of contract, the contractor would visit locations where materials are kept and keep them stocked. This would eliminate the necessity for individual ordering. This system is known to work well with office supplies that are constantly used such as copier paper.
- Contact Staples contract representative to evaluate blocking materials from purchase.

### ***3.6 Facilities Planning and Engineering Department, Organization 8512, Energy Operations***

Energy Operations supervises the energy management program for SNL/CA. The organization is made up of two individuals who oversee program activities on a part-time basis. As described in Section 2.6, energy use for all large buildings is metered monthly. This data is compiled in a database. Recently, there have been problems with this database and, at the time of the interview, its functionality was in question.

Numerous energy saving measure have been completed in the last several years. A number of lighting retrofits were made including changing to T-5 ballasts. Variable Air Volume (VAV) hoods were installed in the IMTL and they have made VAV's standard design. They are using energy savings technologies in most new buildings and standard specifications include sustainable design for lighting, carpeting, water and maybe others.

At SNL/CA, there is no space charge back for usage or occupancy. This is paid for through the corporate structure and is not charged back to organizations. This does not give building occupants impetus to conserve energy.

The major energy conserving potential consists of re-evaluating previous energy assessments. Several years ago, an assessment was performed to improve energy efficiency. Projects were selected based on an energy rate of 2.8 cents per kilowatt-hour. Since energy prices have nearly doubled in California since this study was done, projects that were shelved due to a long payback period may now be more feasible.

Addition P2 opportunities include:

- Installing Motion detectors, electronic ballasts, TA-8
- Ensuring P2 measures applied to Building 913 are used in all D&D operations
- Install computer controls for Building 964 air handler
- Consider lighting retrofit from T5s to T8s.
- Integrate ESPC funding.
- Reduce the exhaust turnover at the tritium stack in Building 968 (From meeting with Environmental Monitoring managers) if applicable safety measures are still met.

### ***3.7 Maintenance and Engineering, Organization 8513, Maintenance Warehouse Operations***

Maintenance and Warehouse Operations maintains SNL/CA equipment such as diesel trash trucks, emergency generators, Cushman carts, and forklifts. A majority of the purchases are tracked through a database known as MAXIMO. SNL/NM P2 staff is currently working with NM procurement personnel to utilize this database to track construction purchases of EPA designated items. This upgrade could probably be applied to CA as well.

Their major waste streams include tires, and oil. Tires and v-belts are recycled (ground and used for road base) however; re-tread tires are not purchased due to perceived quality and regulatory issues. They are in the process of standardizing oil so that only 30W oil is used. This will reduce inventory and waste, but the oil will not meet EPA standards for re-refined oil since they have not been able to find a vendor for re-refined 30 Weight oil. P2 ideas mentioned include:

- Locate a source for and purchase re-refined 30W oil.
- Evaluate the potential for using electric vehicles.
- Work with SNL/CA to add green purchasing to MAXIMO database.
- Review the Spill Prevention and Counter Measures Plan to gain information on fueling stations.

### ***3.8 Maintenance Engineering, Organization 8513, Purchasing***

This department manages and maintains utilities for SNL/CA. Their activities include:

- Civil works such as roads, sewers, drains, tanks, ducting, sprinklers, cooling, heating, lighting, and landscape maintenance.
- Mechanical, structural, and electrical repairs associated with office and laboratory buildings and guard posts

- Equipment repairs associated with lighting, air conditioning, water, steam and gas supply, heat pumps, power supply, boilers, heavy machinery, and special laboratory equipment.

Work orders are generated for repairs and upgrades and preventative maintenance of equipment. They use SNL/NM's MAXIMO purchasing system for construction purchasing.

They have institutionalized a closed-loop contract for tires for carts and bicycles but they currently use new tires for forklifts because of perceived integrity problems with re-tread. A Safety Engineer is evaluating this decision. All purchases are reported to the P2 coordinator. Their fluorescent lights and ballasts are recycled.

P2 Opportunities include:

- Work with SNL/CA to add green purchasing to MAXIMO database.
- Provide green purchasing training to purchasing personnel.
- Follow up on Safety study re-tread tires

### ***3.9 Maintenance Engineering, Organization 8513, Facilities Modification Team (8513-1)***

This group is responsible for maintenance of Facility vehicles and landscape. They conduct some structural work including small remodels and lighting upgrades and manage the oil storage area and paint shop. There are approximately 50 people within facilities department.

This organization generates a number of waste streams, some of which are recycled or minimized. Pallets and scrap wood are taken to a facility in Livermore for recycling. Some batteries are recycled. A covered lubricant storage site recently replaced and exposed storage area. This eliminated and oil and water waste stream that was generated when oil was contaminated with rainwater and other material.

Wastes from the paint shop include empty paint cans, calking, wipes, paint sticks, buckets and aerosol cans. Oils, lubricants, ethylene glycol, and batteries are generated from maintenance of equipment. Frequency of oil changes is determined by oil testing to optimize the number of oil changes. Green waste from landscape maintenance is a major sanitary waste stream.

Carpet and ceiling tiles are generated regularly from small construction and remodeling jobs. Options for recycling these are being considered. Carpet tiles



were stored at one point, however it was determined there was no economical way to recycle these.

This organization has completed several energy saving projects. T8 lighting fixtures were installed in Building 963. They do spot replacement of older, less efficient lighting with more efficient versions. They have evaluated lighting sensors, but the ROI was too low for implementation.

Preliminary P2 opportunities include:

- Purchasing a chipper to mulch green waste.
- Standardize oils, buy in bulk and evaluate re-refined 30W oil. This could be conducted in concert with Maintenance Warehouse Operations.
- Evaluate the possibility of using electric carts to replace the gas-powered carts currently in use.
- Store the paints and chemicals in the warehouse instead of the paint shop. Also standardize paint colors.
- Purchase necessary supplies for the spectrometer to improve fuel analysis capabilities and reduce maintenance time.

### **3.10 Engineering Services, Organization 8225, 8225-2,3**

Engineering services is made of three areas, the Electronic Prototype Lab, the Machine Shop and the Test Assembly Group (TAG) and Environmental Testing. The Electronic Prototype Lab is discussed in Section 3.11. This organization occupies rooms in Buildings 910, 914, 955, 956, 965, 970 and 979. Their staff consists of 40-45 machinists, inspectors, technicians and test engineers. They generate R&D prototype hardware and fabricate metal parts for weapons related activities. Their main customers are LLNL and other weapons labs.

The organization's largest waste stream is coolant and cutting oil. They also generate metal scrap from milling operations. Radioactive metals such as uranium can be milled, but have not been milled since 2000.

There are several pieces of equipment in the machine shop that are internally contaminated with radioactive material. These will be advertised on the DOE material exchange system and, if a new home cannot be found, will be disposed as low-level waste.

They have attempted to implement a few other P2 alternatives. An evaporator was purchased to reduce the volume of the coolant and cutting oil waste but it has not been used due to permitting requirements. Steam is

used to clean parts and minimize solvent disposal. Their metal scrap that is recycled.

P2 Opportunities include:

- Evaluate coolant/cutting oil recycling and centrifuging to extend life of oil
- Attempt to locate a home for contaminated equipment and/or evaluate decontamination potential.

### **3.11 Engineering Services, Organization 8225, Electronic Prototype Lab (8225-1)**

The Electronic Prototype Lab performs four major functions: strain gauging, electronics fabrication, CAD/CAM operations, and printed wiring (circuit board) development. They employ approximately 10 people who are involved in an intensive training program (4 years with college science classes) and cross-trained in the other areas to allow for personnel to take vacation and sick time. Processes at the facility are generally unchanging.

Wastestreams are generated from the following processes:

- The printed wiring process generates the most hazardous waste and uses the most water. The largest waste stream, the Electroless bath, consists of hydrochloric and sulfuric acids; ammonium hydroxides, ammonium chloride; formaldehyde and sulfuric acid solutions, copper sulfates, potassium hydroxides. They do have a permit for neutralization, but only do small amounts right now because of safety issues and personnel time constraints.
- The electronic fabrication process creates perchloroethylene, alcohol, lead, solder wire/scrap, copper, epoxy resin, some chemicals and solvent recycle sludge.
- The CAD/CAM Operation creates photographic waste such as ammonium thiosulfate and potassium hydroxide solutions.

The lab has already instituted several waste reduction measures including a 30% water reduction in plating robotics and changing to hydrogen peroxide/hydrochloric mixture for etching. This solution is treated for the copper and reused. Ion exchange resin bottles are returned for recycle. The wet chemistry lab (Printed wiring) designed a sump with full collection. It is an automated system has saved a significant amount of water.

Pollution prevention ideas include:

- Filtration for photographic waste
- Automating the waste neutralization system.

### **3.12 Materials Chemistry, 8722**

Materials chemistry engages in wet chemistry, organic and polymeric synthesis and production of demonstration parts and intellectual property. The organization consists of 5 primary employees and 12 or 13 people who use the facility. The organization is housed in Building 941 in rooms 1130-1133.

They use small quantities of chemicals, mostly solvents for chromatography, separation, reaction purification, and some cleaning. They regularly update the inventory of these technical grade chemicals with a barcode reader since the CIS is about 6 months behind the actual inventory levels. Their waste streams are mainly organic and are from chemicals used in processes and in cleaning. These are mainly halogenated solvents such as methylene chloride and carbon tetrachloride. They also use methanol and certain oxidizers. They generate acidic or basic waste, but do not neutralize the waste. Waste from packing silica gel, (considered California hazardous), empty containers, alkaline batteries and solvent-contaminated lab wipes are also generated.

Problems occur with summer students who do not properly manage or dispose of chemicals.

The following P2 ideas were suggested at the meeting:

- Improve training for summer students and others in P2 and other ES&H issues.
- Investigate the possibility of a hazmat pharmacy
- Introduce virtual chemical exchange
- Improve check-in-check-out procedures for post docs and SNL scientists.
- Ensure that waste characterization is not too conservative
- Include shelf-life dates on barcodes
- Consider rechargeable batteries.
- Consider digital photography

### **3.13 Materials Chemistry, 8722, Plastics Lab**

The Plastics Lab is part of Materials Chemistry and is located in building 942-room 1312. They employ 2 students and 3 regular staff. They make items in larger quantities than the rest of the Plastics lab and use larger quantities of chemicals and generate larger volumes of waste. This lab has a controlled entry system and has problems with abandoned chemicals.

Chemicals are housed outside in climate-controlled storage containers based on chemical hazard category.

Waste streams from the Plastics lab include: methylene chloride, aerosol cans from mold release solvent, alkaline batteries, and photographic film. The Lab has already implemented some P2 measures. They try to minimize waste from reacting their epoxy catalysts to form solids. They are trying to replace sodium naphthalene with alcohol for Teflon removal. They have evaluated buying mold-release solvent in bulk to eliminate aerosol cans, but the bulk form has a higher solvent content, making it potentially more hazardous. They also use some rechargeable batteries.

They do not currently track what or how much hazardous waste is being generated since it “does not really help the bottom line” according to Lab personnel. Every once in a while ESH will remind users of chemical safety and management of specific chemicals, personnel interviewed found that it would be helpful to get those reminders out more often.

Some P2 ideas include:

- Require annual training on chemical inventory and waste issues.
- Increase frequency of P2/ESH reminders on chemicals

### **3.14 Industrial and Combustion Processes, Organization 8361, Radiography Lab**

Industrial and Combustion Process Radiography Lab is located in Building 906, Rooms 115-20, 113, and 155 and employs a staff of 17 people. They perform three main functions: radiography, energetic materials and decomposition studies and wet chemistry. Radiography performs experiments on energetic material, mainly for internal customers. The Wet Chemistry Lab performs general chemistry for external customers, mostly the Navy and other weapons labs.

The major waste stream from radiography results from change out of photo processing chemicals. Because of quality issues, this work cannot be done digitally. They do not recover the silver from photo processing because it is considered treatment. Other waste streams include vacuum pump oil, grease, explosives, batteries from personal dosimetry and small amounts solvent (methanol and acetone) for cleaning.

P2 ideas include:

- Evaluation of regulatory issues and the technologies for silver recovery
- Recycling photo chemicals

## **4.0 Results of Analysis**

This section summarizes the results from analysis of waste generation, environmentally preferable purchasing and energy use data, and the interviews with selected organizations. The purpose of this section is to identify and prioritize candidate organizations for formal PPOAs. Table 3 is a decision matrix that illustrates how the organizations were identified as candidates for a PPOA. The table ranks the organizations based on the criteria discussed in the SNL/CA PPOA Project Plan. These criteria include: large waste generation rates, high potential for improvement in environmentally preferable purchasing, and high potential energy and/or water savings. Additional criteria include ease of implementation and potential cost savings.

The decision matrix puts the most emphasis on waste generation by ranking each of five different waste categories. SNL must meet annual Performance Measures for reduction of these wastes. A category was also added for California hazardous waste. Although there are no performance measures associated with this waste, it makes up a large percentage of SNL California's waste streams. Environmentally preferable purchasing is ranked separately since this is also a DOE performance measure. Although energy and water conservation are not listed separately, their effects are considered under cost savings. Ease of implementation is an important factor since it often predicts the success for implementation of P2 Projects. Successfully implemented projects generate enthusiasm and support for future projects that may entail a higher degree of difficulty.

Each category is ranked from 1 to 10 with 1 representing low potential and 10 representing a high potential for improvement. Each organization can have a possible score of 80 based on the sum of the individual criteria. Organizations are arranged in the table from highest to lowest potential. The decision matrix is the basis for planning assessments during FY02, FY03 and FY04. Based on the matrix, four organizations were chosen for further study. Plans for this work will be discussed in detail in Section 5: Recommendations/Scheduling/Budget. The remaining organizations will be prioritized as funding and approval for more PPOA's becomes available.

**Table 3. Decision Matrix for Potential Environmental Improvement**

<b>Organization</b>	<b>Potential for Hazardous Waste Reduction</b>	<b>Potential for California Regulated Waste Reduction</b>	<b>Potential for Sanitary Waste Reduction</b>	<b>Potential for LLW Reduction</b>	<b>Potential for Mixed Waste Reduction</b>	<b>Potential for Increased Green Purchasing</b>	<b>Ease of Implementation</b>	<b>Potential for Cost Savings</b>	<b>Total Ranking</b>
Maintenance Engineering, Facilities Modification Team	9	9	9	0	0	7	10	8	<b>52</b>
Maintenance and Engineering, Maintenance Warehouse Operations	9	9	9	0	0	8	8	6	<b>49</b>
Maintenance Engineering, Purchasing	5	5	6	0	0	9	10	8	<b>43</b>
Engineering Services, Electronic Prototype Lab	10	10	5	0	0	2	4	9	<b>40</b>
Environmental Operations, Waste Management	8	8	3	0	5	0	5	6	<b>35</b>
Environmental Operations, Stormwater, Wastewater, and Groundwater Management	9	9	0	0	0	0	7	10	<b>35</b>
Engineering Services	9	9	3	1	1	2	3	6	<b>34</b>

**Table 3 Continued. Decision Matrix for Potential Environmental Improvement**

<b>Organization</b>	<b>Potential for Hazardous Waste Reduction</b>	<b>Potential for California Regulated Waste Reduction</b>	<b>Potential for Sanitary Waste Reduction</b>	<b>Potential for LLW Reduction</b>	<b>Potential for Mixed Waste Reduction</b>	<b>Potential for Increased Green Purchasing</b>	<b>Ease of Implementation</b>	<b>Potential for Cost Savings</b>	<b>Total Ranking</b>
Materials Chemistry	8	8	3	0	0	3	5	6	<b>33</b>
Facilities Planning and Engineering Department, Energy Operations	0	0	0	0	0	8	10	10	<b>28</b>
Industrial and Combustion Processes, Radiography Lab	8	8	0	0	0	2	3	6	<b>27</b>
Logistics and Procurement	0	0	5	0	0	10	6	5	<b>26</b>
Environmental Operations, Low Level Waste (LLW) Program	0	0	5	6	5	0	4	5	<b>25</b>
Health and Safety Department, Chemical Inventory/MSDS Management	5	5	0	0	0	7	2	4	<b>23</b>

## **5.0 Recommendations/Scheduling/Budget**

This section presents the recommendations for future assessments and the monetary requirements for completing them. In general, one SNL/NM staff member will be assigned to work with SNL/CA on each of the individual assessments. One site visit will be planned for data gathering, brainstorming, etc. An additional site visit may be necessary to present the results of particular assessments, but will be integrated into the overall schedule to minimize travel costs. Schedules and estimated costs are summarized in Table 4

### **5.1 *Fiscal Year 2002***

#### **Maintenance and Engineering: Facilities Modification Team and Purchasing**

The Maintenance and Engineering Department's Facilities Modification Team and Purchasing Team are two of the largest generators of both RCRA and California –regulated hazardous waste. In addition, they also generate a significant amount of sanitary waste. Because of the nature of the material they purchase, there is significant potential for improving green purchasing as well. The combined score of these two organizations in the decision matrix was 95 out of a possible 160 points.

Hazardous and California-regulated wastes generated by the Maintenance and Engineering Department include: Empty paint cans, calking, wipes, paint sticks, empty buckets, aerosol cans, oils, lubricants, and ethylene glycol. Sanitary wastes are mainly green waste from landscape maintenance. Items purchased will also be a prime focus in this assessment since they are a major purchaser of EPA-designated items including oil, tires, and construction materials.

The operations of these two teams are diverse, but will be evaluated in a single assessment due to personnel and resource overlap. Based on these factors the first PPOA will be performed on this organization. The expected cost of this assessment is \$18,411 and the expected completion date is October 15, 2002.



## **5.2 Fiscal Year 2003**

### **Maintenance and Engineering: Maintenance Warehouse Operations**

The Maintenance and Engineering Department's, Maintenance Warehouse Team is a significant contributor to the generation rates of both RCRA and California –regulated hazardous waste. Significant amounts of sanitary waste are also generated. Purchasing practices also show significant opportunities for improvement. The score of this organization in the decision matrix was 49 out of a possible 80 points and ranked second in overall potential for improvement.

Hazardous and California-regulated wastes generated by the Maintenance and Engineering Department will be the main focus of this PPOA. Items purchased will also be evaluated in this assessment since they are a major purchaser of EPA-designated items including oil, fuel, and tires.

The Maintenance Engineering Department's Maintenance Warehouse Team will be evaluated in a single assessment. The expected cost of this assessment is \$18,411 and the expected completion date is January 1, 2003.

### **Engineering Services, Electronic Prototype Lab**

The Engineering Services, Electronic Prototype Lab is the largest generator of both RCRA and California –regulated hazardous waste. The score of this organization in our Decision Matrix was 40 out of a possible 80 points and ranked fourth in overall potential for improvement.

Hazardous and California-regulated wastes generated by the Electronic Prototype Lab include mixed acids, alcohol, lead, solder wire/scrap, copper, epoxy resin, some chemicals and solvent recycle sludge. The acid baths will be a prime focus in this assessment since the majority of waste generated is associated with the bath system.

The Engineering Services, Electronic Prototype Lab, will be evaluated in a single assessment. The expected cost of this assessment is \$18,411 and the expected completion date is April 30, 2003.

### **Liquid Effluent Control System (LECS)**

The LECS system has generated continually large quantities of hazardous waste. This generation is also tied to permit violations, making this operation a high risk for regulatory liability. The system is tied to hazardous waste generation at several buildings. The factors causing the wastewater to be hazardous are unknown at this time.

Due to the potential difficulty of this assessment, it will be treated as a separate assessment requiring multiple P2 staff members and several site visits. The expected cost of this assessment is \$47,870 due to the complexity and is expected to be completed by September 30, 2003.

**Table 4. Scheduling and Estimated Cost for FY02-FY03 PPOAs**

<b>Scope</b>	<b>Time Line (proposed start dates)</b>			<b>Total Cost</b>
#1 Maintenance Engineering, Facilities Modification Team & Purchasing	August 20, 2002	SNL personnel Site Trip	200 hours 1	\$18,411
		<b>FY 02</b>		<b>\$18,411</b>
#2 Maintenance and Engineering, Maintenance Warehouse Operations	October 1, 2003	SNL Personnel Site Trip	200 hours 1	\$18,411
#3 Engineering Services, Electronic Prototype Lab	January1, 2003	SNL/NM Other SNL/CA Site Trip	200 20 1	\$18,411
#4 Environmental Operations, Stormwater, Wastewater, and Groundwater Management (LECS)	May1, 2003	SNL/NM Other SNL/CA Site Trips	300 20 2	\$47,870
		<b>FY03</b>		<b>\$84,692</b>

## **APPENDIX A – SITE VISIT AND INTERVIEWS**

**Organization: Engineering Services 8225:****Bruce Affeldt, Manager**

Electronic Prototype Lab, 8225-1, Vern Barr, Team Leader (Separate Section)

Machine Shop, 8225-2; Jerry Fordham, Team Leader

TAG & Environmental Testing, 8225-3; Ken Buck, Manager

**Buildings/Rooms**

Machine Shop, 2 rooms: 979-038 and 914 –130

955, 956, 965, 970, 910-300, top floor of 910 (Plating)

**Staffing**

40-45 people: 12 machinists, other inspectors, technicians, test engineers.

**Contacts**

Bruce Affeldt-294-2293

Jerry Fordham-294-3585

Ken Buck-294-1324

**Functions**

Generate R&D prototype hardware

Generate some PC boards, minimum production

They share some work with 14100. 14100 uses California's p-card to get material fabricated to expedite processes. CA uses 14100 for building classified hardware. The vault's main function is to build classified hardware.

**General Information**

Their main customers are LLL and other weapons labs

**Waste Streams**

Bruce estimated that 110 gallons of coolant/cutting oil are generated every couple of months. They have an evaporator, but have not used it. There was concern by CA ES&H that the evaporator will produce hazardous waste and/or be considered treatment of hazardous waste. Without the evaporator process, the Machine Shop will generate less than 10 gallons of effluent per month. The evaporator is probably not cost effective.

They haven't milled DU since 2000. They have milling machines and others contaminated with DU-238. Most are internally contaminated and will probably be shipped as LLW. They will advertise across the DOE complex first. They also generate stainless steel scrap.

Machine shop is in a vault like area. Access to this area is limited. All uncleared personnel must prearrange entry to this area and will be escorted at all times.

They do parts cleaning but have minimal solvent use since they use steam for most cleaning.

**Organization: Maintenance Engineering, 8513, Purchasing**

Manager: Bob Clevenger

**Buildings/Rooms**

963/101, MO3, 9623

**Contacts**

Connie Stewart, Purchasing Requisitions/MAXIMO, 294-2214

Diane Shimada, Customer Funded Work-294-3320

Susie Davalos, Dispatcher, Work Orders-294-2576

Paul Canepa, Tool Cribs/Contracts-294-2884

Gerald Vincent, Custodial Services Manager-294-2600

**Functions**

Manage facility maintenance and utilities.

Connie Stewart generates work orders and preventative maintenance orders for facilities.

**General Information**

Construction is divided into two types: Customer funded, which is usually done by a contractor and in-house repairs

**Purchasing**

Institutionalized closed loop contract for tires for carts and bicycles.

Currently using new tires for fork lifts because of perceived integrity problems with re-treads.

Al Du Charme (Facilities Planning and Engineering, 8512) must agree to technical construction specifications for products.

CA uses MAXIMO system for construction purchasing

Engineering uses outside contractors for construction work.

Purchase Bio-soy hydraulic oil-Gil Arthur (see Facilities)

Paper and paper products-using Staples

Fuels: Bay Co Petroleum- 30W oil, gas, diesel (currently not using re-refined oil).

Purchases are reported to Sally.

They buy Quick-Crete cement, which probably doesn't contain fly ash.

**Waste Streams**

Fluorescent light tubes are recycled by Hayward Technologies

Ballasts are recycled at the disposal facility.

## **P2 Ideas**

Could use Sandia Paper Company that has a local warehouse. ----Call Sharon Sergeant

See Conference call transcript with John Beitia at the end of this document.

## **Organization: Low-Level Waste Program, Environmental Operations, 8516**

Warren TenBrook-Radiological Specialist

## **Buildings/Rooms**

922

## **Contacts**

Warren TenBrook-294-1218

Dee Dee Dicker-Waste Costs- 784-3932

## **Functions**

The Low-Level Waste Program coordinates efforts for characterization and waste certification and assists researchers in defining parameters and identifying waste types.

## **Purchasing**

Waste Management purchases specialty-shipping containers for low-level and mixed radioactive waste. These shipping containers are critical to the program and are procured under a controlled and documented system. Suppliers providing these containers are evaluated and selected on as the basis of specified criteria.

## **General Information**

**Metals Moratorium** has not significantly affected the site. Only Building 913 would have been affected, but it was determined that these areas did not meet the definitions of the moratorium. Toff Garcia: contact for Moratorium ER and D&D are the same thing. There was a complete closeout out 913 in 2000, which is reflected in the numbers that were reported for Waste Management. Most activities fall under ER unless redoing small jobs.

Waste streams have to be forecasted on a yearly basis. Generators provide input, but program engineers actually generate the forecasts. This also holds true for Hazardous. Dee Dee Dicker forecasts hazardous waste.

PKE (Process Knowledge Evaluation) is used as a way to reduce mixed waste. It was initiated through the IDT (Interdisciplinary Team). Team members from each discipline participate. IDT meets on a weekly basis, by appointment with Line members. They review process for points for improvement. The IDT fits with NEPA process and is used for both routine

and non-routine waste streams. There is some question about what to bring and when to bring it to IDT though. The process is always initiated at the start of a process, but not always consistently initiated for changes in process. Evaporator bought at Machine shop was an example of someone bypassing IDT and what happens (Evaporating not currently up and running). Due to possible misinformation regarding what is covered in previous IDT when processes change.

Everyone has to generate a “permit” to fulfill the NEPA process and follow hazard assessment as per ISM. Review lines work documents (SOP etc). Sally has been involved with and Laurie will continue to be. Statement in SOP for P2 and P2 taught in generator training.

Expected to ship waste within a year, including PPE.

### **Waste Streams**

There are two waste streams that are profiled: R&D and Support Services. These are expected to become one. These two were consolidated from nine. The waste streams are made up of uranium parts, soil, concrete rubble, PPE, plastic lining, steel, contaminated metal equipment. (Waste Profiles in file).

Main waste is PPE

They have packaged sources that are ready for disposal but have not yet disposed of any. High dose sources have already been packed and would be difficult to unpack (<100 microcuries). These could be packaged with other wastes.

Source Owners are RP and CRADLE.

Metals are recycled through Reapplication.

Routine and Non-Routine will get thrown into one container.

Research waste is a routine waste stream (Profile 15)

Support Services waste is usually non-routine waste.

Non-routine is largely waste stream 16.

SNL/CA does generate mixed waste, but in very small quantities. Most mixed waste previously generated was due to Building 913 deconstruction. Mixed waste is generally contaminated lead. Mixed waste is shipped to Envirocare of Utah. Generation of mixed waste must be approved by VP

SNL/CA does not currently have a site treatment plan. Due to SNL/NM treatment facility DOE determined that SNL/CA does not need one. Their RCRA Part B Permit requires to shipment of waste within one year.

### **P2 Ideas**

Consider purchase controls on sources

Source Banks are an option. RP manual has some info on source bank (control of source material).

Costs could be saved in revising WPF (Nevada has stringent requirements for source characterization).

Small sources could be reused.



Improve filling of void spaces.

There is a compactor on site. It is difficult to use since the Hazardous Waste Pick-up Team is uncleared and the compactors are located in a vault type room. When compacting is needed, the team members have to be escorted. Now they would like to dedicate one just to LLW.

Return material to the "client": LLNL. Jim Bartel, Environmental Operations Manager, is talking with project people to work out a deal. Not really a reduction mechanism, but could save SNL money.

Uranium classified waste- can ship to NTS (it can't be declassified), but AL usually stands in the way. This may also affect the Machine Shop's business by making it more expensive to work. Customers may go elsewhere.

**Organization:** Storm water/Waste Water/Groundwater,  
Environmental Operations, 8516

**Buildings/Rooms**

922

**Contacts**

Janet Harris 294-3083

Robert Holland (Robert is transitioning into Janet's position)-294-3755

Scott Hatchett, Facilities Cooling Towers-294-3497

Doug Chinn-white paper on LECS upgrade-294-4662

**Functions**

There are six liquid effluent control systems (LECS) of varying sizes. Industrial water is tested prior to leaving site. The LECS is plumbed to labs that collect industrial wastewater. If the water discharged to the LECS meets city of Livermore limits, it is discharged to sewer. If it's over the limit it is pumped out and sent offsite to a treatment facility (Seaport) where they perform flocculation. It may be under hazardous limits but over release limit. Local system does only biological not metals. LECS is only for lab wastewaters. It is not plumbed to areas that release radioactively contaminated water. The only radioactively contaminated water that is generated onsite is from the machining uranium process. Water is kept in 30-gallon containers where uranium fines are placed for cooling. Waste Management cannot accept liquid radioactive waste, so therefore this water is absorbed on clay prior to acceptance. Generator knowledge is used as determination mechanism. Janet sits on IDT and that is used to determine what can go down the drain.

Each LECS has at least two tanks: one is used while the other is sampled.

Storm water personnel obtain grab sample every 1000 gallons at the outfall. The samples are sent off for analysis based on city requirements. There is continual sampling for flow rate and pH. All analysis is done post LECS. Both daily and weekly analytical results are reported to the city.

Discharge is manual and the program manager makes the decision to release the water.

Normal flow of 32 gpm peaks to 180 gpm when LECS is discharged decreased to 10gpm on nights and weekends. Hits can occur on weekends/evenings due to maintenance off-hour activities.

They use generator knowledge for storm water releases. They will be doing a sitewide drain survey. Water effluent is considered the IDT process.

LECS waste is slurried, pumped and disposed off-site.

### **General Information**

Wastewater permit is on file

The CRF (906) and the Cooling Tower (907) are problems. A new wing was built and a cooling tower was installed with new plumbing. Problems started with copper levels at the LEC at that time. There are thousands of feet of Cu in the chilled water loop. This loop also has sacrificial anodes. Because limits are so stringent there are problems exceeding regulatory limits, particularly for copper. One theory is that metals are scavenged from the piping in cooling tower system for Buildings 907, possibly through galvanic corrosion. It may also be from chilled water at the CRF. An ion exchange unit will be installed at the cooling tower to minimize sending water offsite.

Permit violations: approximately 3-4 per year mainly due to metals (mainly copper, some lead, zinc and silver) over the last couple of years.

Different areas have problems with different metals.

The 914 Machine Shop, managed by Jerry Fordham, may generate radioactive liquid waste, but it is handled completely separately.

NALCO provides chemicals for cooling towers

### **Waste Streams**

Waste water that is over release limits. Approximately 4000 gallons per incident

### **P2 Ideas**

Evaluate biocide use in cooling towers

A \$50,000 ion exchange unit was purchased but is not currently being used. There are issues with usability and mobility and problems with the particulate matter clogging filters. They used 5 micron and 100-micron pre-filters with the same results. Using a similar system could reduce volume being sent off-site.

LECS Tanks are combination of steel and PVC. Facility 968 Rm 120 tanks are too small. There is a white paper (in file) describing the need for tank upgrade of steel tanks to larger tanks. Need to re-route bad RO water from this system. May mask illegal discharge. Once through RO system, reject water is sent to the LECS. Large quantity of water, every drain in the

facility goes to the LECS minus the toilets. Separation of drains from the LECS would reduce the volume of unnecessary water going to the LECS.

**Organization: Maintenance Engineering, 8513, Facilities  
Modification Team 8513-1:**

**Supervisor: Chris Armijo**

**Staffing**

There are approximately 50 people within facilities department.

**Contacts**

Chris (Marion) Armijo-294-2726

Gil Arthur-preventative maintenance, bio-diesel-294-1222

**Functions**

This group is responsible for Facility, vehicle and landscape maintenance. They carry out some structural work including small remodels and lighting. They manage the oil storage area and paint shop.

**Waste Streams**

Pallet recycling is in place. Pallets are taken to a facility in Livermore, which also takes scrap wood (often nails removed).

Oils and lubricants

Air compressors, mobile and stationary cranes, lubricants are not changed on a predetermined time, but are tested to determine when change out should occur. They have an analyzer on site and are testing on a quarterly basis. Not currently looking at for two cycle engines.

Coolants: Ethylene glycol is recycled at the TSDF.

They would really like to work on getting rid of carpet tiles. Used tiles are in the warehouse on pallets. The carpet tile-recycling program will be re-evaluated next year. Dupont has a program in place that seems feasible but carpet will need to be purchased from them.

Ceiling tiles that can be reused are, due to the different types of tiles. Used tiles are stored in the warehouse. Have looked into lighting sensors, but determined to have too low of an ROI for implementation.

Seem to be a lot of batteries that we are disposing of/recycling. Not sure exactly where they are all coming from.

Paint shop: Wastes include: empty paint cans, wipes, paint sticks, buckets caulking, and batteries. Aerosol cans: used for markings around site. Currently do not have problems with expiration dates, every once in a while, but nothing major.

**Energy/Resource Use**

Currently do spot re-lamping vs. group re-lamping: could save a lot of time and possibly money. Could use a little seed money to switch over to group re-lamping.

Building 963 installed the T8 lights and fixtures. Should be seeing a reduction.

## **P2 Ideas**

Green waste is a major Sanitary waste stream. They use a chipper for making mulch from green waste. It is at least 25 years old and due to noise issues can only work with equipment for 1 hour per day. They still have to dispose of some waste due to inability to run chipper on a constant basis due to time and budget issues. Getting a new chipper could greatly reduce green waste disposal.

Currently trying to standardize oils: from 4 kinds down to 2. Buying in bulk. Buying synthetic oils- not currently purchasing re-refined oil.

They added a new storage site. Now, containers are designed to eliminate oil contamination by reducing the ability of contaminants to mix with the oil. Integrated Fluid Handling is the contractor handling the system.

Currently all carts are gas fueled. Look into capacity for carts weigh. They need to carry 400-500 pounds. Also determine how they would handle steep grades.

They use a large quantity of paint and numerous different types. They would like to store the paints and chemicals in the warehouse instead of the paint shop to enhance their ability to standardize colors and reduce the amounts purchased. This idea has been generated, but the implementation is not there.

A spectrometer would improve fuel analysis capabilities and improve maintenance time

## **Organization: Electronic Prototype Lab, 8225-1 (formerly 8219-1, and 8419-1),**

**Vern Barr, Team Leader**

### **Buildings/Rooms**

910-310

### **Staffing**

10 People

### **Contacts**

Vern Barr-294-2557

### **Functions**

Strain gauging

Electronics fabrication

CAD/CAM Operations include board layout and photo tooling. They use large sheets of resin layered with copper. Copper is etched from panels. Copper is laminated on epoxy glass resin to control expansion. The uncured epoxy is added to melt and become solid.

Printed Wiring Development can do everything from schematic to loaded board. They employ two people.

All lab personnel are involved in an intensive training program (4 years with college science classes) and cross-trained in the other areas to allow for personnel to take vacation and sick time.

Processes at the facility are stable and repeatable

Have own DI water system, which is a once-through system.

## **Waste Streams**

Waste streams stem mainly from 3 different functions:

The Printed Wiring process is the biggest hazardous waste generator and largest water user. Formerly, they used TCE and recycled it. Now they use an aqueous solvent, which can't be recycled. This goes to the LECS. Use ion carbon exchange (30 gpm) to pull out metals. The pH must be 6.5-8.5.

Plastic bottles can no longer be triple rinsed and disposed in the landfill. Lab users were not following procedures and empty containers were ending up at the landfill with the DOT hazardous labels still attached. Wastewater program leads did not want rinseate going to the drain. Also, the State of California is very restrictive on the definition of an empty container. Shredding is being considered.

Electronic Fabrication generates perchloroethylene (AP20) and lead solder wire/scraps, and some chemicals. They recycle cleaning solvent and must dispose recycling sludge every 10th cycle. They can't use aqueous cleaner since some parts are damaged by water. They use alcohol for this reason.

CAD/CAM Operations generate photographic waste (silver stream), ammonium thiosulfates, potassium hydroxide, small usage, but they have looked at an evaporator system (but labor intensive)

Printed circuit board process is in line with industry standards

The largest waste stream is from the Electroless Bath. This waste stream is made up of hydrochloric and sulfuric acids; ammonium hydroxides, ammonium chloride; formaldehyde and sulfuric acid solutions; copper sulfates, and potassium hydroxides.

They have a permit for neutralization, but only do small amounts right now because of safety issues and personnel time constraints. Would like to use it more and get a new heat control tank to allow for faster processing. Baths remain overnight and are only changed out with the bath is expired (time or contaminant) Life of baths varies based on oxidation or Cu uptake. Often six 55 gallon drums are disposed monthly.

Plating Robotics worked with modification to use only functions needed 30% water reduction

Etcher-switched to H2O2/SO4 etchant secondary coolers, chilled water loop, primary valve, and city water secondary.

They precipitate copper crystals to recover the copper. Peroxides and sulfuric acids are used to avoid crystal buildup

## **P2 Ideas**

Wet Chemistry Lab (Printed wiring) designed as a sump with full collection. Automated system has saved a lot of water

For copper etchant they are using a hydrogen peroxide/hydrochloric mixture that is treated for the copper and reused.

Filtration for photographic waste

Enhance neutralization process to make it easier.

## **Organization: Waste Management, Environmental Operations, 8516**

### **Buildings/Rooms**

Hazardous Waste Storage Facility, RMWSF Bldg. 961, 922

### **Contacts**

Robert Oteri 294-4984

Leighton Ford 294-4506

### **Functions**

Robert arranges for waste transport, picks up the waste, lab packing and bulking. Leighton specializes in regulatory compliance for hazardous waste issues.

When waste is generated, line personnel contact ESH through the Hotline. The ESH Hotline is used anytime the Line needs a quick response from any ESH discipline. Waste Pick-ups (chemical and radioactive) are scheduled after a call to the Waste Management Office Management Assistant. The waste tag is reviewed at the pick-up point to assure correctness. Any waste that is not correctly identified is left behind. The waste generator is contacted for further information before another attempt is made to pick up the waste. The waste is characterized at the HWSF. To reduce errors, processing time and pick-up attempts, as well as improve data quality, Waste Management is going to an electronic disposal tag. Characterized per DOT shipping criteria. The waste tag gets and goes in daily slot. The tags will become electronic hopefully this year. The waste is then characterized to the point of DOT acceptability and a characterization is determined based on a fingerprint. Charge back is based on SNL/NM loads. There is not a charge for LLW.

Waste Operations has about 60 profiles that are standard. When a new waste stream will be generated the profile is either modified or a new one is created.

Radioactive Storage deals with very low-level radioactive waste. Low-Level waste is picked up from generators already packaged. This waste is added to a DOT spec drum or box. They haven't researched the possibility of using Launderable PPE during the waste management activities. The Storage area Building is included in SNL/CA Part B Permit. They have one box of LLMW that will be shipped to Envirocare this summer (encapsulate then bury).

Hazardous waste facility: Cabinets hold small containers. The containers are lab-packed then transferred to segregated storage bays outside.

They use both Generator information and analysis to profile waste.

Waste is then packaged and sent out for disposal. They did a cost benefit analysis on bulking. Results showed it's safer and easier to lab pack.

Waste charge back does not represent true cost because costs to line are higher since they are based on weight instead of drum size. Works out well for SNL/CA because of the amount of waste CA is generating and the fact that it is not that much. Chargeback is based on spending \$275, 000 and numbers are based on that.

### **Waste Streams**

They do fairly heavy volume reduction including the lab pack exemption; commingle and consolidate; compact; work with generators to separate Sanitary wastes from hazardous wastes; recycle when possible.

Oil filters and oil are both being recycled. Only 55-gallon sizes are being recycled. Lab pack oils are not.

Biggest problem is that the volumes of waste generated are so small that it makes it hard to use P2 technologies.

Recycling: Batteries are recycled (minus alkaline), oil, empty containers (drums) (poly and metal), fluorescent lamps, ballasts, glass, cardboard

The Hazardous Waste Group makes the disposal determination for all containers. All containers are sent to them first. Containers are largely non-RCRA, but Cal hazardous.

Training is offered once a month. Every new hire must attend training. The ESH portion is 10 minutes. It is strongly suggested to the line personnel to waste generator training if it is applicable. There is no P2 training for either new hires or to waste generators. Most generators are pretty good. There are problems with orphan material when someone leaves.

A large waste stream of caulking-related waste is generated from the tool crib.

Aerosol cans are sent off site as waste, in very, very small volumes

Gas cylinders-little bottles non-refillable, must dispose 100K annually to dispose

### **P2 Ideas**

Take better advantage of the SAA system...increase up to the 55-gallon and stop shipping small amounts.

Add significant P2 section to new employee orientation and generator training. Make update annually

Find refillable, small gas cylinders.

Improve programmatic info gathering and data entry, for example, use fewer tags and fewer containers

### **Organization: Materials Chemistry, 8722**

*(Notes do not clearly differentiate between Keifer and Zifer/Hunter labs)*

### **Buildings/Rooms**

941-1130, 1132, (complex of rooms) 1133

### **Staffing**

5 people primary, 12-15 people who use facility 6 students

### **Contacts**

Marion Hunter-294-1250

Tom Zifer-294-3406

### **Functions**

Wet chemistry, organic and polymeric synthesis, R&D

Produce demo parts and intellectual property

Use small quantities of chemicals

Solvents used for chromatography, separation, and reaction purification.

Some solvents are also used for cleaning.

Regularly update their chemical inventory with barcode reader since CIS is only updated every 6 months.

### **Purchasing**

Use technical grade chemicals

Chemicals are not automatically shared between labs. Do keep chemical inventory but bought on different project numbers, takes time.

### **Waste Streams**

Mainly organic: Used in processes and in cleaning.

Waste generated from packing silica gel: California toxic

Acid waste and base wastes. Not currently doing any neutralization as is considered "treatment".

Halogenated solvents include methylene chloride, carbon tetrachloride, methanol, acetone, and oxidizers.

Problem with summer students not knowing waste disposal or safety requirements

Have a problem with staff members leaving departments and leaving stuff behind. No check out procedure that includes ES&H. They dump and run.

Problem with abandoned chemicals when people leave the lab.

Shared chemical cabinet with multiple users.

Alkaline batteries

Empty containers

Lab wipes with acetone/methanol.

Several of the microscopy units use all old style film. Do have the option of going to an electronic version. Equipment for digital is very expensive and hard to justify.

### **P2 Ideas**



Train summer students, attitude adjustment. This idea was met with enthusiasm.

Hazmat pharmacy

Virtual chemical exchange

Better training

Better check-in-check-out procedures for post docs, SNL scientists.

Look at disposal streams and how waste is characterized. (Too conservative?)

Make it conservative to apply to bad labs according to Laurie.

Include shelf-life issues on barcodes

Rechargeable batteries

Investigate the possibility of broadening the use of the internal barcode system to apply to other labs.

Digital photography (est. 300K?)

Find out who is actually buying chemicals and have them check out.

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### **Organization: Materials Chemistry, 8722, Plastics Lab**

#### **Buildings/Rooms**

942 1312 (Keifer)

#### **Staffing**

2 students, 3 staff

#### **Contacts**

Pat Keifer (plastics lab)-294-1414

#### **Functions**

Plastics lab

Keifer makes things, buys bigger quantities, used more chemicals, 10-gallon quantities of methylene chloride

#### **Waste Streams**

Keifer has more control of his lab. Keeps locked.

Epoxy catalysts are 100% reactive, no VOC's. He tries to minimize waste by reacting materials to form solids.

They generate paint, mold release, and Freon derivative/CO2 solvent.

Sodium naphthalene serves as free radical to attack Teflon in a Teflon removal process. This generates hazardous waste so they started using alcohol.

Chemicals stored outside in atmosphere-controlled environment based on types.

R&D labs have central storage shed so it appears better than other lab working which had bottles are on counters and were not very neat.

Aerosols are used for mold release (solvent). This can be bought in bulk, but it does have a higher solvent content.

They use a special application silver loaded paint used as a conductive coating. Pat Keifer is analyzing various brands to evaluate, which brands are more conductive. They are also evaluating silver flakes and silver powder.

Students are also an issue

Do not currently track what or how much waste is being generated. According to Keifer, reducing waste does not really help bottom line.

A large quantity of wastes is generated due to actual production of materials. Alkaline Batteries are used quite a bit. Some are rechargeable some are not. Having a centralized system to keep batteries would help.

## **P2 Ideas**

Use Rechargeable batteries or create central storage for batteries.

Every once in a while ES&H will remind users of specific chemicals, would be helpful to get those reminders out more often.

Annual training (more regular than now) on waste/ chemical inventory issues

Eliminate or reduce use of aerosol cans since they must be disposed as hazardous waste.

## **Organization: Energy Operations, Facilities Planning and Engineering Dept. 8512**

**Gary Shamber, Dept. Manager**

**Buildings/Rooms**

MO3, 14

**Contacts**

Howard Royer-294-2635

Todd Felver: 294-2178

**Functions**

Howard is the Energy Manager as well as the Power Systems Manager. He is involved in other projects as well. There is consistency in the power management program since Howard has been involved in energy management for about 10 years. Todd is project manager HVAC and Controls and helps w/energy management

## **Energy/Resource Use**

Completed a number of lighting retrofits, (low hanging fruit). Changed to T-5s, VAV hoods in IMTL. VAV's are standard design, now.

Energy rates used to be 2.8 cents. Now, they are 5.5. This could make some projects that have already been evaluated and shelved due to low pay back more feasible now.

Have not integrated ESPC funding. Used to get funding from IHEM

Metering system upgraded

Building 960 has same air handler as DISL. Stepped lighting and day lighting.

Building 964 controls are antiquated. The air handling system runs 24 hours.

Completed large retrofit of lighting in most of the major buildings. And are using energy savings technologies in most new buildings.

Standard specs include sustainable design. Lighting, carpeting, water...

Have a metering system for tracking energy usage. All large buildings are separately metered. Bob Ernesto tracks energy use per building but the spreadsheet blew up.

There is not a space charge back for usage occupancy. All paid for by Vice President. Does not give building occupants any impetus to make energy changes.

Energy systems are per building complex.

## **P2 Ideas**

Re-evaluate existing write-ups of potential projects based on new energy prices

Motion detectors, electronic ballasts, TA-8

For D&D activities look for opportunities for P2. Same specs used for 913 will be used on other D&D operations. Try to recycle as much as possible

Controls for Building 964 air handler

Lighting retrofit TIR to T8

Hetch Hetchy very soft water may be problem with cooling tower LECS leaching metals.

The tritium stack in Building still blows at 50,000 cfm even though there is no longer tritium work occurring. (From interview with Stormwater personnel.)

## **Organization: Maintenance and Engineering 8513**

### **Manager, Bob Clevenger**

Dwight Soria, Maintenance Warehouse Operations Project Leader

### **Buildings/Rooms**

9633/105

### **Contacts**

Dwight Soria, Fueling, Tires- 294-3336

## **Functions**

Maintenance of diesel trash trucks, emergency generators, Cushman carts and forklifts.

They have approximately 150 carts (unleaded) used for hauling people and/or equipment, depending on the organization. They buy these vehicles directly from Cushman. Facilities recommends what to buy. Facilities does PM even though they don't own them. Some Local vendors are GSA suppliers. Carts need a 1-ton rating. Majority of carts are ½ or ¾ ton, but they are moving toward a 1 ton. GSA supplies parts for Cushmans

Check the SPCC (Spill Prevention Counter Measures and Control) plan to find information on the fueling station (how large the tanks are). They are probably 800-gallon tanks. Paul Canepa would be a good choice to find out usage information

Anything with a license plate cannot be fueled at the fueling station.

Use Graybar/MAXIMO

### **Waste Streams**

Tires: Recycling tires and V-belts. The recycler grinds them and uses them for road base. They are not currently using retread tires. Valley Tires is their tire supplier.

### **Energy/Resource Use**

Evaluating oil standardization. Prefer to convert to 30W (Fred Richards Mechanic). 30W does not come re-refined. Use Bay County Petroleum

### **P2 Ideas**

Does 30W oil come in re-refined form?

Evaluate electric vehicles. How much can they haul?

Check into regulations for state of California and use of retread tires. As per Laurie, a request has been made to the Safety Engineer to evaluate this issue for forklifts.

### **Organization: Industrial and Combustion Processes Radiography Lab Organization 8361**

**Buildings:** 906/115-20 Radiography, 155 General Chemistry, 113 Energy Decomposition

#### **Staffing**

17 people

#### **Contacts**

Lois Johnston-294-3040

#### **Functions**

Radiography experiments on decontamination of energetic material, mainly for internal customers

Wet Chemistry Lab external customers General Chemistry laboratory is just starting and is a new laboratory. Navy, Weapons

Decomposition and Energetic Materials

### **General Information**

Do not have too many problems with students except maybe in wet chemistry Everyone in CRX has it available. CRF and CRADL use the lab. Could be a problem, they are currently working on improvements. Training will be necessary and required. All chemicals are owned by individuals who are

named in the CIS. Everyone buys his or her own materials. Have not solved what would happen if someone left- is going to look into (CRADLE and CRF). All users are supposed to have their area to store material and are responsible for their own waste disposal. Sarah is doing a room training session before allowing access has not had one yet and will let Laurie know. If someone uses the lab and generates waste, they are supposed to put their name on the waste tag. To work in wet chemistry lab, full out form Sarah Allendorf and she provides basic training but may not include ESH, p2). Everyone buys own chemicals. People call in their own waste.

### **Waste Streams**

Radiography: Most waste is from chemical change out of photographic developer. No possibility of going digital due to resolution. Currently not doing very much radiography due to lack of customer demand. Film quality is critical. AFP is the name of the manufacturer. Due to work load there is some down time that is possible and could test to see if a feed back loop is working. Has to change out chemicals every quarter; about 5 gallons of developer and silver. Used to have a larger processor 15 gallons does not have silver recovery unit. They are not allowed to recover silver since it is considered treatment. Want to bench scale to test recycling in place.

Decomposition and Energetic Lab generates oils and some small amounts of solvent for cleaning (methanol)---need a quick drying solvent. There are a few remaining explosives, which are kept separately. They also generate vacuum pump oil, grease, acetone and alkaline batteries from personal dosimetry for survey meters

### **P2 Ideas**

Silver recovery

Recycle chemicals ATP machine

Rechargeable batteries.

**Organization: Health and Safety Department Org. # 8517, Chemical Inventory/MSDS Management (Via Phone Call with Mark Brynildson on 6/12/02 and conversation with Laurie Farren on 6/5/02)**

**Contact:** Mark Brynildson-294-3150

### **Functions**

Chemical Inventory/MSDS Management

### **Purchasing**

California has exactly the same CIS system as NM. In fact, the data resides on a CA computer.

Compressed gas is purchased from Matheson Gas, Newark CA.

CA asked to be released from the JIT contract with Fisher. This contract did not work for CA. NM contracts are not optimized for California. Before, Fisher shipped the chemical to Alb. then to CA. This process was very inefficient and time-consuming. Fisher doesn't always have everything the researchers need but they are required to provide it. There is often a competitive delay caused by other vendors who want to make Fisher look bad. Fisher hires a delivery service, which can be challenging since they are not used to dealing with HAZMAT.

Now, chemicals are bought through P-card, though this may be against the rules. All chemicals go through a centralized receiving facility where they are bar-coded. They don't have to rely on JIT to barcode, like NM does, since they have this central receiving facility. A variety of chemicals are ordered from a variety of vendors and usually arrive within 2 days. Researchers get stuff quickly. There is no monitoring for quantities. They are encouraged to borrow from each other if there is excess. CIS reconciles every summer. 85 to 90 percent find rates (that means they lose 10 to 15% of chemicals).

**General Stores (Information provided by Laurie Farren):** Previously all types products (paper, pens, desktrays, and specialized stock) were stored in a warehouse. Was eliminated due to \$\$ issues about 5-8 years ago. Used to have a large stock that took up a lot of space and had 5 five full time personnel running it. Took phone orders and did a warehouse pick. Before that they had "self" service stores that were stationed throughout the site, but were removed due to abuse. Now every group on site purchases materials on there own from who ever they want. Not a consistent purchasing mechanism in place. The general Stores stock analysis would also take a lot of time assuring that products stocked contained recycled material, such as copier paper.

### **Organization 8523, Procurement**

From a conference call with John Beitia, Stacy Richardson, Kristin Klossner, and Jimmy Romero, 6/19/02

**Contacts** John Beitia –294-3360

Marge York, Purchasing manager 294-2242

### **General Information**

AT SNL/CA, contracts, policies and procedures are the same but they have included additional optional sources. CA site customers didn't like JIT because they would say that delivery took too long. It was not always about higher price. Also, there were concerns with not having a local vendor to work out problems. They did lots of things to try to fix the problem including working with local rep for corporate Express in CA. Even then, they still had problems. There were too many complaints involving invoicing not being done properly. Secretaries wanted another method or source. Two years ago,

Abe Wallace and Jeff Manchester in NM Procurement held a staff meeting to brief all on quarterly performance issues. They were selling a new contract they had just awarded to Staples. Lockheed Martin (LM) has a corporate-wide office supplies contract that offers on-line delivery of office supplies. NM already had JIT which was considered too slow because of requisitions times etc. CA decided not to go with that contract. Manchester saw this as a way of solving some problems at CA site. So John Beitia was asked to look into it. He talked to LM buyers and secretaries and brought Staples out to demonstrate. If Staples could do what they said they could do, they wanted them. Procurement management said to make it happen. Purchasing Manager and a team decided that the Executive Order was an option and not required.

In the mean time, John had discussions with Sally. Her job was to coordinate with Staples rep as to what products would and would not be sold. She went through catalog to provide info to Staples. Staples were supposed to be blocking. Blocked virgin paper to Sally's group but no one else. The policy has always been what the customer wants. Give them as many sources as they need to get their job done. Procurement was not going to play policeman. Price for virgin paper was cheaper so Management did not want to block virgin paper.

Office supplies are now ordered through the Staples catalog online. There is a pick list of the top 400 Lockheed Martin items. Those items receive the greatest discount. During the ordering process, one of the top 400 will pop up with a notation describing this as a cheaper product. Person then has a choice. LM takes care of all of that. CA can order from wherever they want. The recycled paper is one of the top 400 and the brand chosen was Great White. This is not the best quality and no one likes it because it gets stuck in copiers and printers. John talked to our paper contractor who gave him prices for recycled paper. Because the contract costs are higher the virgin paper is still cheaper even after he dropped price to CA. He has not talked to Ron from Willamette.

Everyone who orders under the Staples contract has his or her own account. Staples tracks people by org. and name and can generate reports to provide as much detail as we need. Most secretaries don't buy through pro-card because of contractor status. People store ordered paper in cabinets.

## **P2 Ideas**

Stacy suggested a Breadman contract. A prearranged quantity of paper would be delivered to a prearranged location and then the Department billed. Only recycled contents paper offered.

Look at Staples online. Need access Debbie Barnes, contract administrator: 1-800-447-2525 x1024. Ask Debbie about paper blocking. Blocking items is probably just a matter of contacting Staples and asking.

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**Miscellaneous Notes:**

Laurie Farren will check into how much Sanitary waste Facilities generates.

**To Do:** Provide information on B20 and E85 blended fuels to Bob and Chris.  
Fred Richards: BioSoy contact.



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